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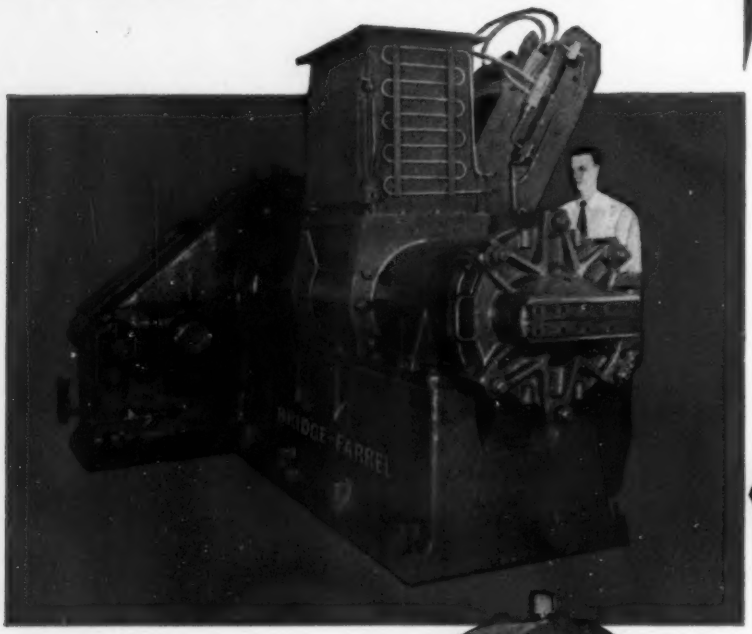

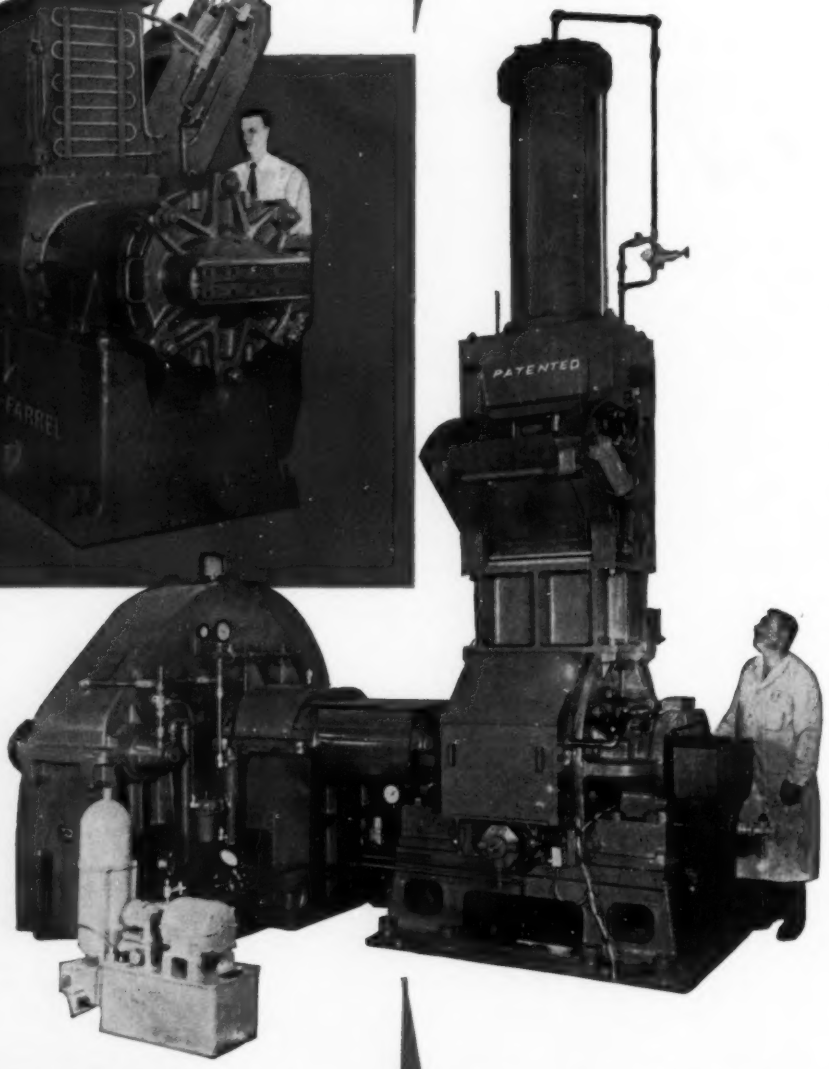

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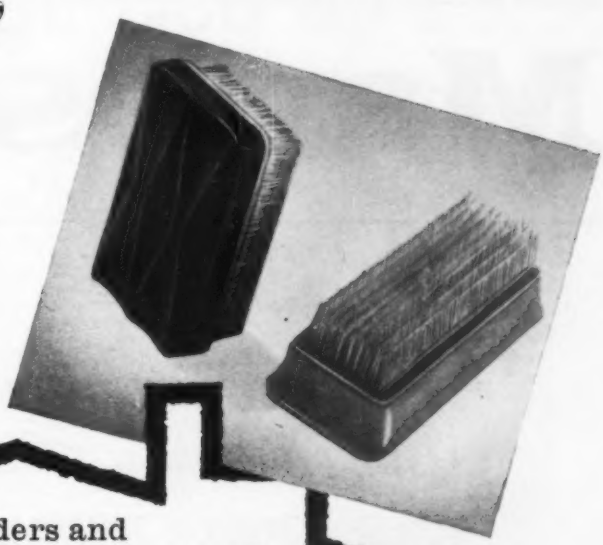

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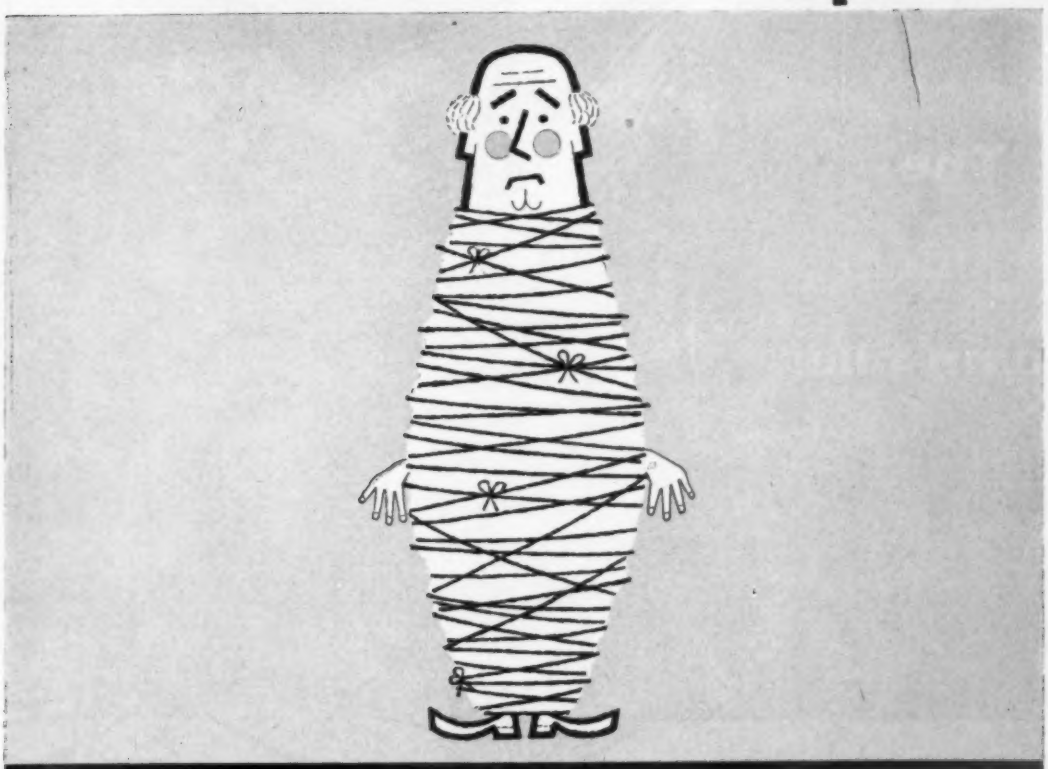

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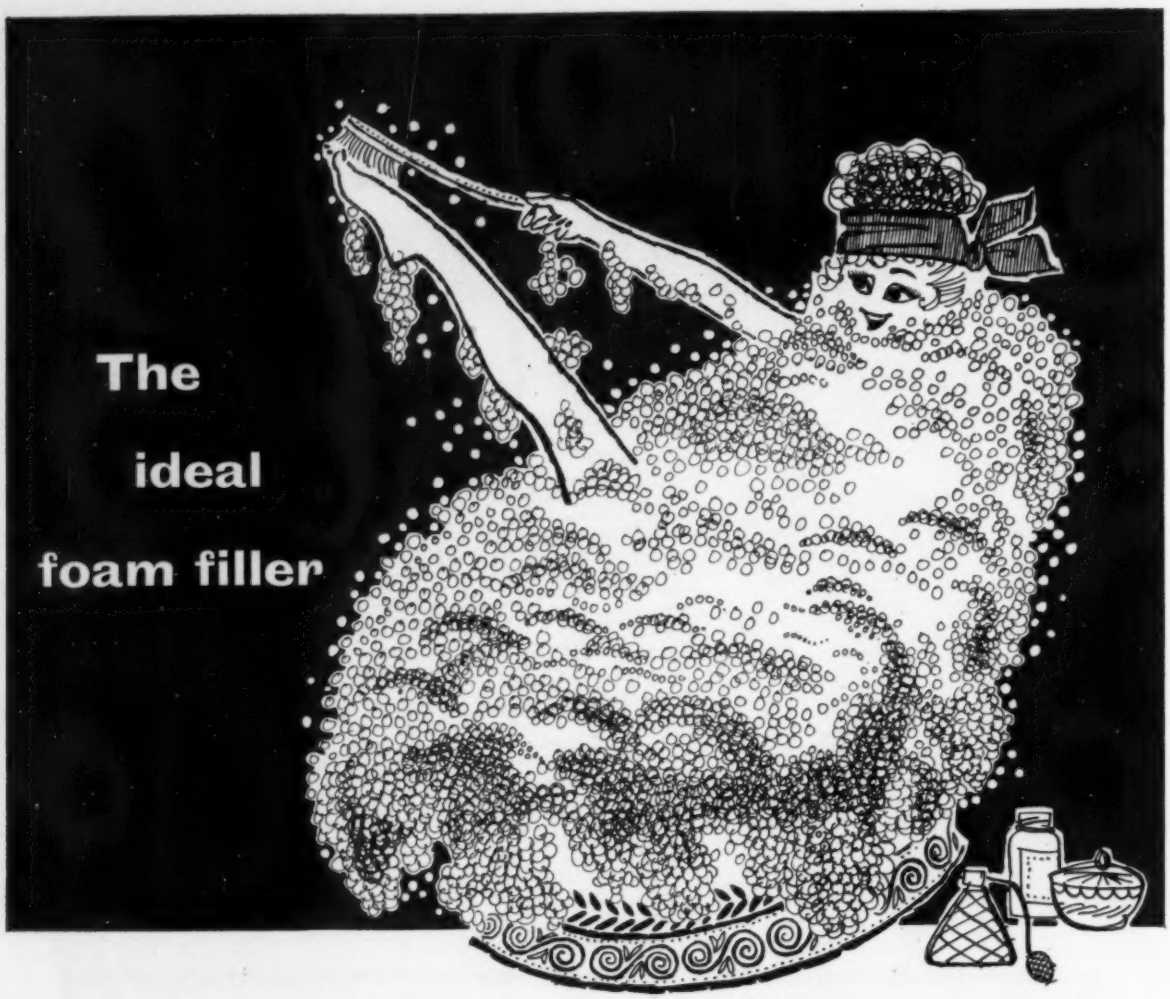

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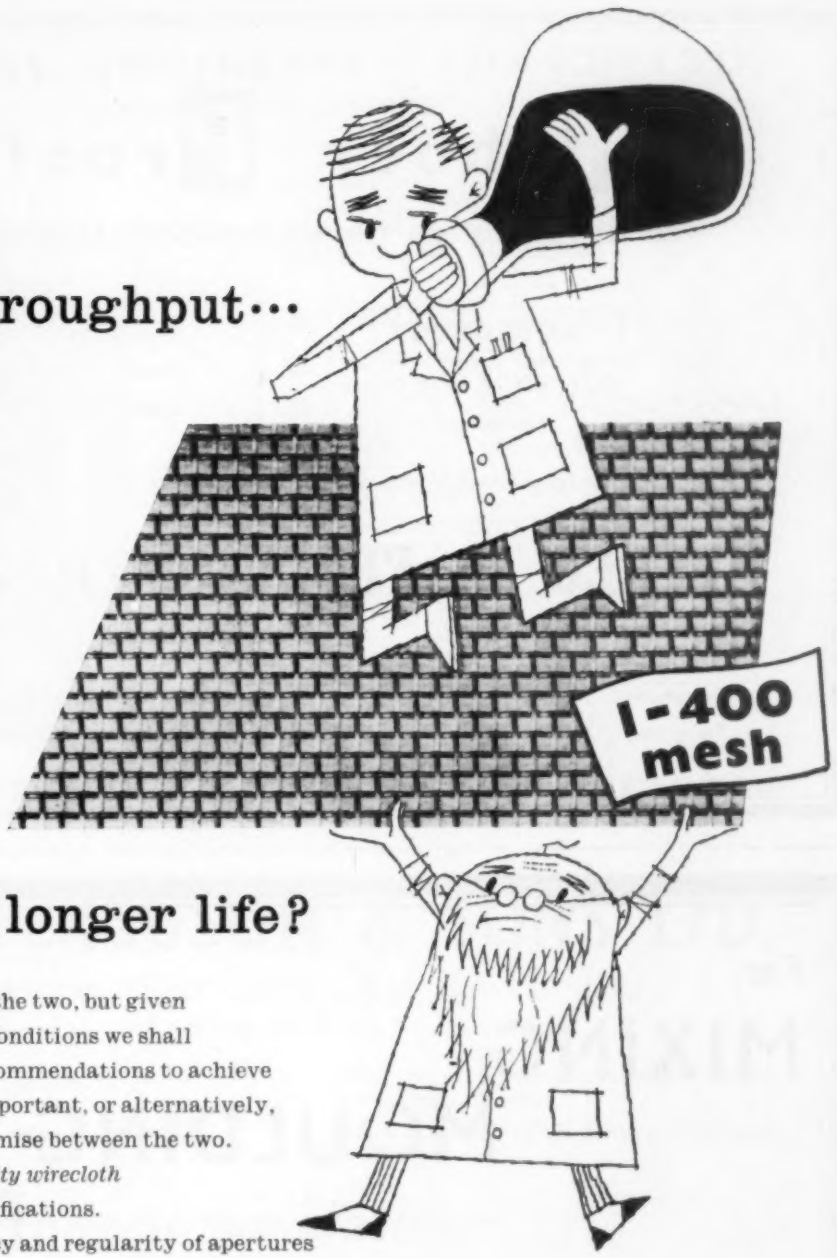

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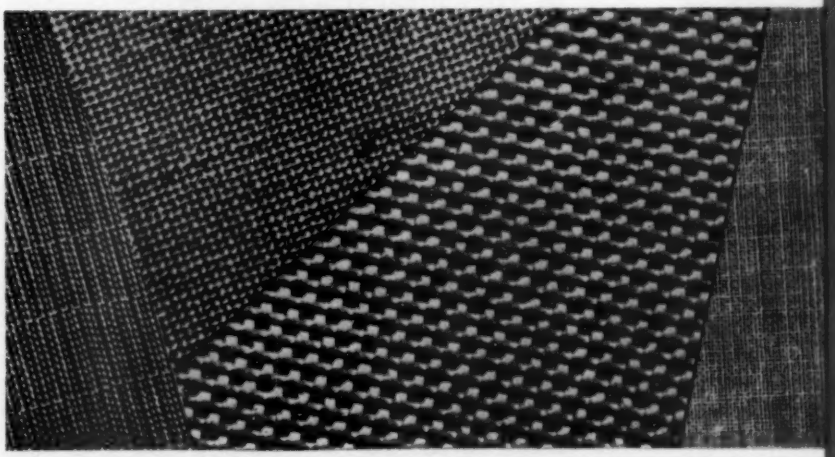

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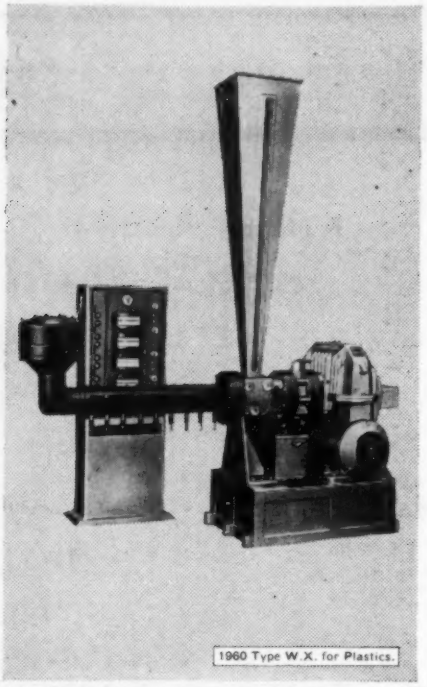

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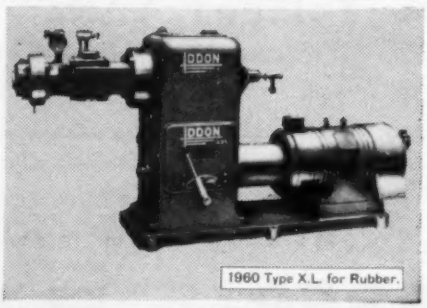
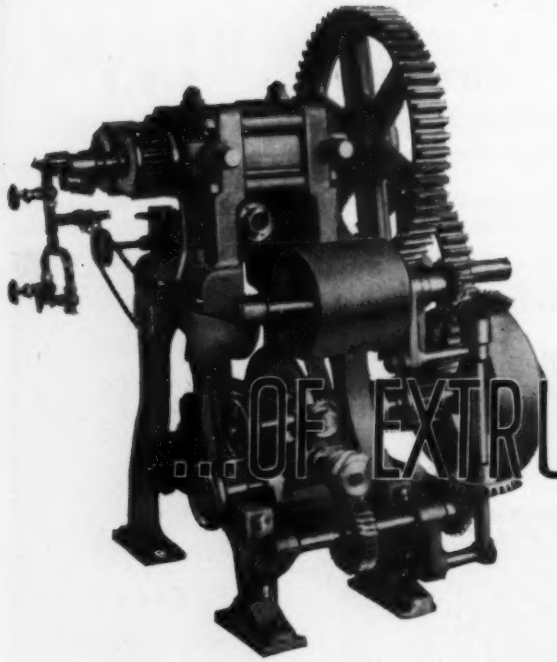


1960 Type X.L. for Rubber.



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IN ITS 77th YEAR

October 8 1960

Editorial

NOTES OF THE WEEK 523

Articles and News

NEWS BRIEFS 524
NATURAL RUBBER RESEARCH 526
MACROPLASTIC 528
AMERICAN LETTER 541
PLASTICS CONVENTION AT HELSINKI 545
IRI EXAMS 547

Features

VIEWS AND REVIEWS 534
MEN AND MATTERS 536
QUESTION CORNER 538
RUBBER STATISTICS 547
BOOK REVIEW 548
RUBBER AND PLASTICS STOCK MARKET 549
RUBBER MARKETS 550
INDUSTRY INTELLIGENCE 551
TRADE MARKS 552

Classified Advertisements . . . 552 Advertisers Index . . . 556

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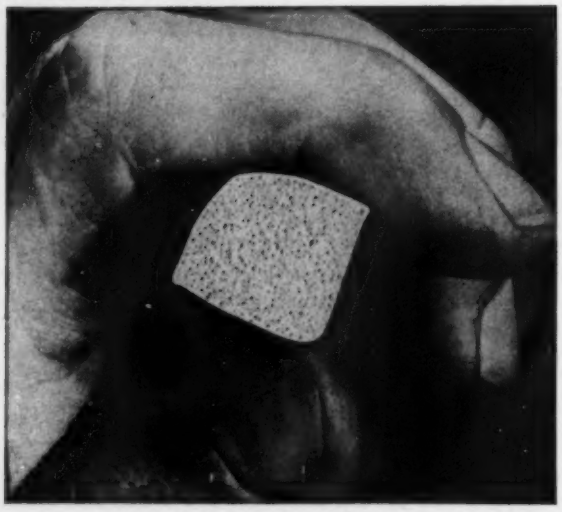

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NOTES of the WEEK

Export and Design

THE livelihood of a man, a business, a country is of primary importance. That is why our export trade is a perennial talking point, or should be. It is after all through exports that we exist. As with the weather, another familiar topic, there is an almost inexhaustible number of aspects. One of these, as far as exports are concerned, is design. This brings us to the 15th annual report of the Council of Industrial Design, published last week, which contains some pertinent remarks about the awareness of British firms of the value of good design.

The report, for the year ended March 31, 1960, starts with a mention of the fact, reported at the time in *RJIP*, that an international jury last year awarded to the Council the *Gran Premio Internazionale la Rinascente Compasso d'Oro*. This award, sponsored by the Italian store La Rinascente, is for an outstanding contribution to industrial design. It is usually supported by an Italian national award, but the jury decided to give only the one international prize. The reasons for making the single award, as set out in the citation, were interesting. The jury recognized, not only in Italy but elsewhere too, a ' crisis in design ' hinging on ' inadequate co-ordination between designers on the one hand and producers and consumers on the other.' It found one of the main causes of this situation to be a lack of educational organizations capable of promoting steady progress in design.

The Council's report points out that only a minority of British firms have as yet accepted that a convinced and progressive design policy is a function of good business management, and far too little attention is yet paid to designing for the convenience of the user, whether in the home or factory. The report states: ' The long-term commercial importance of a design-conscious public in this country cannot be stressed too often, for it is only on such a basis that British industry can really produce good design efficiently for export.'

Design and Export

IN the 15 years since the CoID was founded, there have been some notable advances but, as the Council emphasizes, even more energetic steps must be taken to win for Britain a reputation for modern, imaginative design equal to that of her leading competitors in Europe and elsewhere, not only in the consumer goods industries but also in the engineering and capital goods which are even more important to our export trade. Some interesting figures are quoted in the report. Public attendance at the Design Centre continues to average over 2,200 daily. The Record of Designers received over 800 requests in the year from industry, and CoID staff paid over 700 visits to manufacturers in 31 industries. In addition, the CoID has arranged Design Centre exhibitions in Lagos, Accra, Zurich, Brussels, Berlin, Copenhagen, Munich, Lisbon and Toronto. It is encouraging to realize the increasing part which the plastics manufacturing industry is playing in the achievement of good design.

Technical Adaptability

IN the world of today, technical change is more rapid than at any time in recorded history. Not so long ago, a boy learned a trade and had little else to learn—as regards that one particular job—for the rest of his life, for there was little or no change in the techniques employed. Things are very different now, as Sir David Eccles pointed out in a speech a week ago yesterday when he opened the new building of the Liverpool College of Technology. How many boys at school today, he asked, can expect to use the same methods, machines and materials all through their working lives? ' Clearly then,' he said, ' one of the great objectives of our time is to help through education men and women to be adaptable to change.' Sir David went on to review briefly some of the progress made in technical education during the four years since the publication of a White Paper outlining the aims for increases in students, teachers and buildings. The number of students in full-time courses has doubled, reaching 112,000 last year. There has been a sevenfold increase in the number of students attending sandwich courses, from 1,400 to 10,000. Part-time students, mostly on day release, number 500,000. The record for technical teachers had exceeded all hopes, full-time teachers having risen from 10,000 to 17,000. Nearly half of the authorized £100m. new building programme had been completed.

Jack's Crop

SOME 63 years ago there was a farm where the Halex factory now stands in Walthamstow, London. It is reputed to have been called Jack's Farm, but whether or not that is true few people can have anticipated the strange crop that was to grow there—factory buildings producing plastics. Last Monday, the 100th building was formally opened. It represents, with services, an outlay of £41,000 and it contains more than £160,000 worth of plant and equipment. Altogether a notable addition to this division of the British Xylonite Company and one which will increase the harvest.

NEWS *Briefs*

MORE SBR FROM HULS — BHC £10M EXPANSION DU PONT PLASTICS IN HOLLAND — STOCKPILE SALES IN UK — PIRELLI INCREASE CAPITAL

●**United Kingdom** — A mission of prominent Peruvians concerned with Peru's economic development plans is now in London. It has been invited by the Board of Trade to see how the products of British industry can contribute to the development of Peruvian economy. The mission is visiting industrial centres, and will meet the FBI and other trade organizations.

●**Ceylon** — The Government sponsored Co-operative Wholesale Establishment will enter into trade in rubber and other produce in competition with private traders. Trade source here said it was understood that the decision to enter export trade was connected with the Government's desire to develop its own merchant marine. CWE activities previously were confined to import and distribution mostly of essential commodities.

●**United Kingdom** — British Hydrocarbon Chemicals is planning to set up a £10m. manufacturing plant in South Wales. It will be set up near the BP refinery at Llandarcy. The general pattern of operations is expected to follow that of Grangemouth, where the petrochemical complex is also fed from the adjacent BP refinery. This major new venture will not affect expansion at Grangemouth, where three big projects are due to be completed next year.

●**Germany** — Rheinpreussen AG will build a maleic anhydride plant using the Scientific Design process of fixed-bed, catalytic, air oxidation of benzene. The plant, to be built at Merrbeck, will have an initial design capacity of 13,200,000lb. per year. Rheinpreussen is the first company in Germany to employ SD's maleic anhydride process, and the 14th company in the world. The new plant will bring the total capacity of SD-designed maleic anhydride plants to almost two-thirds of the entire world's capacity.

●**United Kingdom** — India Tyre and Rubber Co. Ltd. have announced that because of the current adverse situation in the motor industry the company's factory at Inchinnan, Renfrewshire, will operate on a five-day basis from Sunday, cutting out weekend overtime working. The statement added: 'The motor industry is optimistic about the future and it is hoped that the present arrangements are only temporary.' About 1,000 employees are involved.

●**Germany** — Production of styrene butadiene rubber by BunaWerke Hüls GmbH is being increased by more efficient utilization of the plant (which was originally designed for an annual production of 45,000 tons) and is expected to reach 120,000 tons in 1961.

●**United Kingdom** — The Board of Trade sold 2,050 tons of natural rubber from its stock last month, it was announced on October 3. Of this, 280 tons were for spot delivery; 325 tons for October delivery; 965 tons for November delivery and 480 tons for delivery in December. Rubber still available for sale on October 1 totalled 31,024 tons.

●**Italy** — The Board of Pirelli has increased the company's capital from 28,000m. lire to 30,000m. lire by an issue of two million 1,000 lire shares. This issue was approved by the shareholders' meeting on April 5.

●**United Kingdom** — The Association of Supervisory Staffs and Executive Technicians states that over 200 members — supervisors at the Wolverhampton factory of the Goodyear Rubber Company (GB) Ltd. — will ban overtime from noon today. A union official said the union is seeking recognition as the negotiating body for supervisors.

●**Holland** — The new factory for processing Delrin acetal resin will be built by Du Pont de Nemours (Netherlands) at Dordrecht. Construction of the plant will be begun immediately and production is scheduled to begin in 1962. The resin will be marketed in Western Europe.

●**Sweden** — Scandinavia's first synthetic resins plant is now under construction at Lilla Edet. It is being built by A/B Hercules, a subsidiary of the Hercules Powder Co. The plant is expected to be on stream early in 1962.

●**United States** — SunOlin Chemical Co. — owned by Sun Oil and Olin Mathieson Chemical Corp. — has awarded a $20m. contract to the Lummus Co. for the engineering and construction of an ethylene and ethylene oxide plant. This is to be constructed near Sun Oil's refinery at Marcus Hook. Scheduled to come on stream late next year, the new plant will have a capacity of 225m. lb. of ethylene and 55m. lb. of ethylene oxide. Most of the production is said to be scheduled for major chemical companies in the same area.

'Proper card, that Acherman, isn't he?'— 505

SQUEEZE

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ISR

Natural Rubber Research

SUMMARIES OF PAPERS FROM KUALA LUMPUR

MANY of the world's leading figures in the field of natural rubber have been assembled in Kuala Lumpur for the three conferences which have been taking place there and reported here are brief summaries of some of the papers, full reports will appear in later issues of *RJIP*. The papers summarized have been confined to those applicable to the users of rubber rather than to the planters as these are felt to be of more general interest to readers.

Superior Processing Rubbers

Three papers dealing with various aspects of these materials were read. The first of these on *The Mechanico-Chemical Synthesis of Superior Processing Rubber* was read by R. J. Ceresa and R. A. Wynn (NCRT).

A comparison was made between the superior processing properties bestowed upon natural rubber by: (a) the addition of a proportion of prevulcanized latex to the natural rubber latex prior to the coagulation and formation of dry rubber; (b) the addition of partially vulcanized dry natural rubber to natural sheet rubber; (c) the gelation of sheet rubber by mastication with cross-linking additives.

Mechanico-chemical cross-linking was achieved by representative materials from the classes of multifunctional alkoxides, phenolic resins, unsaturated hydrocarbons and anhydrides.

H. C. Baker and S. C. Stokes (NRPRA) were the authors of a paper dealing with the *Manufacturing Advantages Obtained by the use of SP Rubber* which was delivered by Mr Stokes.

The scope of SP rubbers in commercial usage was indicated with particular reference to the use of PA80, a concentrated SP masterbatch.

PA80 is unique among processing aids in conferring excellent extruding characteristics, while maintaining the full range of physical properties. It appears potentially valuable for conferring SP properties on various synthetic rubbers.

A paper on *New Types of Superior Processing Rubbers* was given by B. C. Sekhar and P. S. Nielsen (RRI Malaya).

An investigation was made into the effects of small additions of selected polymeric materials on the processing properties of rubber. The physical properties of filled and unfilled compounds containing such materials and the effect of method of addition were investigated. It was shown that rubbers containing these materials were superior to normal rubbers in respect of processing characteristics and that the best physical properties were obtained if the polymeric material was added to latex before coagulation.

Graft Copolymers

Methyl Methacrylate Rubber Grafts of Predetermined Molecular Characteristics was the title of a paper by B. C. Sekhar (RRI Malaya).

The effect of monomer and initiator concentrations on the side chain lengths of methyl methacrylate-rubber grafts had been investigated. It was shown that the effect of initiator concentration on side chain length was significant only for monomer concentrations above 25%. Based on these results, a method had been developed to control the molecular weight of side chains effectively. The method was described and technological applications were discussed.

One of the relatively few contributions to the conference from American authors was *Processing and Processibility of Polyisoprene and Natural Rubber* by R. H. Snyder, P. M. Nichols, D. E. Freiwald and H. W. Hoerauf (US Rubber Co.).

Cis-polyisoprene differs from natural rubber in five processing characteristics: mill roll bagginess, crumbling, surface scaling, mouldability, and tack strength. A full description of these terms was given.

Four tests measuring extension and compression stress strain and stress relaxation were described. Quantitative values were given for set, raw tensile, elastic stress component, and viscous stress component; tendency to crystallization was estimated qualitatively. Correlation of these properties with processing characteristics was made.

Bagginess was related to set and elastic stress component.

Crumbling and surface scaliness were related to raw tensile strength.

Mouldability was related to stress relaxation, viscous flow stress component, and set.

Tack strength was related to crystallization.

The utility of these tests was demonstrated where conventional testing techniques were inadequate. An example was the estimation of viscosity at temperatures where internal shearing made Mooney viscosity measurements meaningless.

C. Pinazzi, J. C. Danjard and R. Pautrat (IFC Paris), read a paper on *Reactions of rubber hydrocarbon with some olefine monomers.*

This paper concerned the study of the combination of natural rubber with olefinic monomers, using two different experimental methods: at high temperatures without catalysts, and at relatively low temperatures in the presence of free radical initiators. The corresponding mechanisms were studied. The properties of the products obtained were briefly described.

Preparation and Application of Natural Rubber-Acrylamide Block Polymer was the title of a paper by Shitaro Kunisawa and Juji Minoura (Japan).

Natural rubber acrylamide block copolymer was obtained by heating a mixture of natural rubber and acrylamide mixed on a cold open mill. Studies were made of the effect of the mixing and heating conditions on the polymerization reaction. The copolymer obtained showed good oil resistance and excellent abrasion resistance. Coloured tyres were manufactured from this copolymer on an experimental scale and one of these tyres was tested.

Chemical Studies

Several papers on chemical research were given, one of these was *New Investigations on the Size, Form and Mobility of the Rubber Molecule* by G. V. Schulz and A. Mula (Institut für Physikalische Chemie der Universität Mainz).

Natural rubber can be brominated in dilute cyclohexane solution, whereby the molecular weight, corresponding to the bromine content, increases. For brominated rubber, increasing bromine content makes cyclohexane an increasingly poorer solvent, which is shown by a contraction of the molecule coils and a

decrease in the second virial coefficient. Quantitative results were obtained through viscosity and light scattering measurements.

Cyclohexane solutions of brominated rubber containing about 43% bromine have a θ point at room temperature. Here the second virial coefficient is zero and the coil has an ideal Gaussian density distribution. In this state the coil diameter is about 1.6 times bigger than for completely free rotation. A comparison of these data with X-ray low angle scattering could yield a quantitative measure of possible molecular branching.

Brominated rubber with about one bromine per isoprene residue is a good starting material for the preparation of electron-microscope samples which can be used for the determination of the molecular weight distribution in rubber. The value of weight average degree of polymerization determined by an electron microscope is in agreement with that through (1) light scattering and (2) ultracentrifuge and diffusion measurements. The discrepancy is of the order of 0.5.

One of the many papers by members of the staff of the Natural Rubber Producers' Research Association was on *Some Recent Studies of the Non-Rubber Constituents of Natural Rubber Latex* by B. L. Archer and A. I. McMullen.

The detection, isolation and characterization of four groups of non-rubber compounds present in freshly tapped natural latex, namely proteins, sulphydryl compounds of low molecular weight, mononucleotide pyrophosphates and nucleo-protein, were reviewed. The technological and biological significance of the first three of these groups were briefly discussed.

Another paper given by B. C. Sekhar (RRI Malaya) was on *Inhibition of Hardening in Natural Rubber.*

Evidence was presented in further support of the hypothesis that aldehydic groups are present as an integral part of the polyisoprene chain when it leaves the tree in the form of latex. These are the groups that are mainly concerned in the gelation of rubber on dry storage. A simple method of estimating the number of aldehydic groups per molecule of rubber was described. Results of a survey of the aldehydic group contents and extent of hardening on accelerated storage of clonal rubber were reported.

Another US paper was *Application of Radiation in the Technology of Natural Rubber Latex* by T. C. Gregson, T. H. Rogers, L. B. Bangs, and D. W. Peabody (The Goodyear Tire and Rubber Company).

A study was undertaken of the effects of high energy radiation on natural rubber latex. Cobalt-60 gamma rays were used at doses of from one to 20 megarads. Irradiation improved storage properties particularly with de-ammoniated latex. As the dose increased the latex darkened. Foam rubber from irradiated latex exhibited improved compression and shock efficiency. Tensile strength and elongation were slightly decreased and volume shrinkage of moulded foam stock was increased. The threshold dose was about one megarad. Several additives improved the compression of foam rubber when added prior to irradiation.

Extrusion flow properties of rubber from irradiated latex approached those of easy processing rubber. Irradiation of latex provides a practical method of improving properties for several commercial applications.

Natural rubber latex irradiation treatments could be accomplished on a commercial scale with currently available radiation generating sources, either electron accelerating machines or radioactive isotopes. Preliminary cost estimates on latex foam applications indicate that a 1 Mr dose is more attractive from an economic standpoint than is a higher dose.

Although the results are based on preserved concentrated latex it is reasonable to assume that comparable data would be obtained using fresh natural latex. This would permit irradiation at the plantation site and would allow different products (concentrated latex, improved extruding rubber, etc.) to be made using the same facility.

Engineering Applications

A paper on *Developments in Engineering Applications of Rubber* was given by A. N. Gent, P. B. Lindley and L. Mullins (NRPRA).

There is a general difficulty experienced in designing rubber components, due either to the absence of necessary basic information or to its non-availability in a suitable form. Recent studies which have gone some way towards remedying these deficiencies were discussed. They show how the stiffness of rubber components depends on their shape, size, temperature, mode of deformation and on the nature of the rubber compound. They also provide an understanding of the sources of failure likely to occur in service and of methods of preventing premature failure. With this information, it is now possible to undertake the basic design of rubber components for a wide range of engineering applications without recourse to a completely empirical approach. Recent and novel uses of rubber in civil engineering involving the application of this knowledge were described. These involve its use in bridge bearings and rail fastenings.

Zinc Stability Time and Latex Processability was the title of a paper by J. L. M. Newnham, K. O. Calvert and D. J. Simcox (Dunlop Research Centre).

The zinc stability time or ZST test gives a general indication of the suitability of a latex for a given process. The test is a new approach to the measurement of the stability of latex in the presence of zinc oxide, which embodies modifications and refinements of previous methods. It is based on the attainment of a chemical equilibrium under carefully controlled conditions and characterization by a mechanical stability measurement. The reproducibility of the method has been shown to be good by inter-laboratory testing.

Although the test was originally developed with natural latex after arrival in Great Britain, the method is also useful for characterizing fresh concentrate. The test is also valuable in the investigation of blends of natural latex with butadiene/styrene 'cold' latex.

The method provides a valuable measure of sensitivity to zinc oxide, which is of use for process adjustment or for control checking of consecutive latex batches. The values provided by the test are shown to correlate well with performance in processing. For blends of natural latex with butadiene/styrene 'cold' latex, the test shows how the processability of the natural will be affected by the proportion of the synthetic latex. These conclusions are supported by practical experience mainly in making foam rubber.

Developments in the Use of Latex in Association with Fibres were discussed in a paper by E. G. Pole and S. C. Stokes (NRPRA).

The use of latex in the carpet, non-woven fabric, upholstery and allied industries was reviewed, processing techniques were described and suitable natural rubber latex compounds were detailed.

The present position in *The Technical Merits of Rubber as an Additive to Road Binders* was discussed by L. Mullins (NRPRA).

Small quantities of rubber produce large changes in the physical properties of bitumen and these in turn are reflected in the behaviour of road mixtures. The effects are influenced

Continued on page 531

MacroPlastic

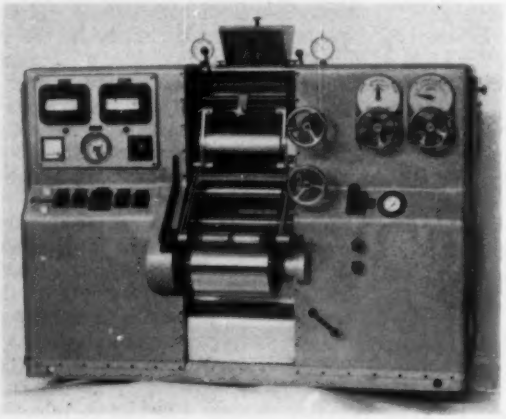
MORE DETAILS OF THE UTRECHT EXHIBITION

THE city of Utrecht, site of the macroPlastic exhibition to be held from October 19 to 26, likes to be known as the heart of Holland. It is in fact very centrally situated and is at the intersection of road, rail and waterways. With 250,000 inhabitants Utrecht is an important industrial centre, but has also become well known as a site for exhibitions. The spring and autumn trade fairs have been held there since their inception and the numerous other congresses, exhibitions and so on which have been held in the city have contributed to its growth.

The Croeselaan site chosen for the macroPlastic has been built largely since the war. The first permanent building, erected in 1953, was the giant Bernardhal, which has 150,000 sq. ft. of exhibition space and is one of the largest heated buildings of its type in Western Europe. The following year saw the construction of the Margriethal of 70,000 sq. ft. and in 1956 the Julianahal with 35,000 sq. ft. was added. The Merwedehal of similar size is the most recent addition.

The city itself offers attractions other than those of the exhibition site and has become adapted to the demands of the visitors. Hotels and restaurants are accustomed to dealing with overseas visitors, good communications offer facilities for sightseeing in the surrounding countryside and the old town has many unusual features worth a visit. All this of course presupposes that the visitors will have time to spare from the exhibition halls in which to enjoy these amenities. The exhibition is, however, closed on Sunday October 23 which will give an opportunity to rest feet tired from pounding round indoors, by pounding round in the open air.

There will be much of interest inside, covering a wide field. Machinery, finished products and raw materials from at least 16 countries other than Britain will be on show.

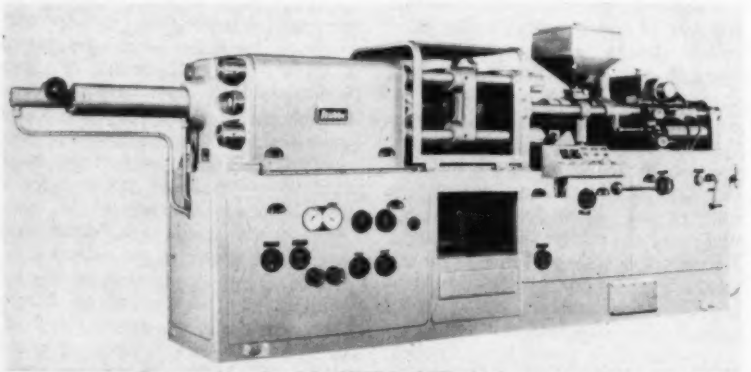


Zimmer plastic coating machine, type KM300, capable of coating a base 30cm. wide at a rate from 3-18 metres per minute. This is the smallest machine in the range

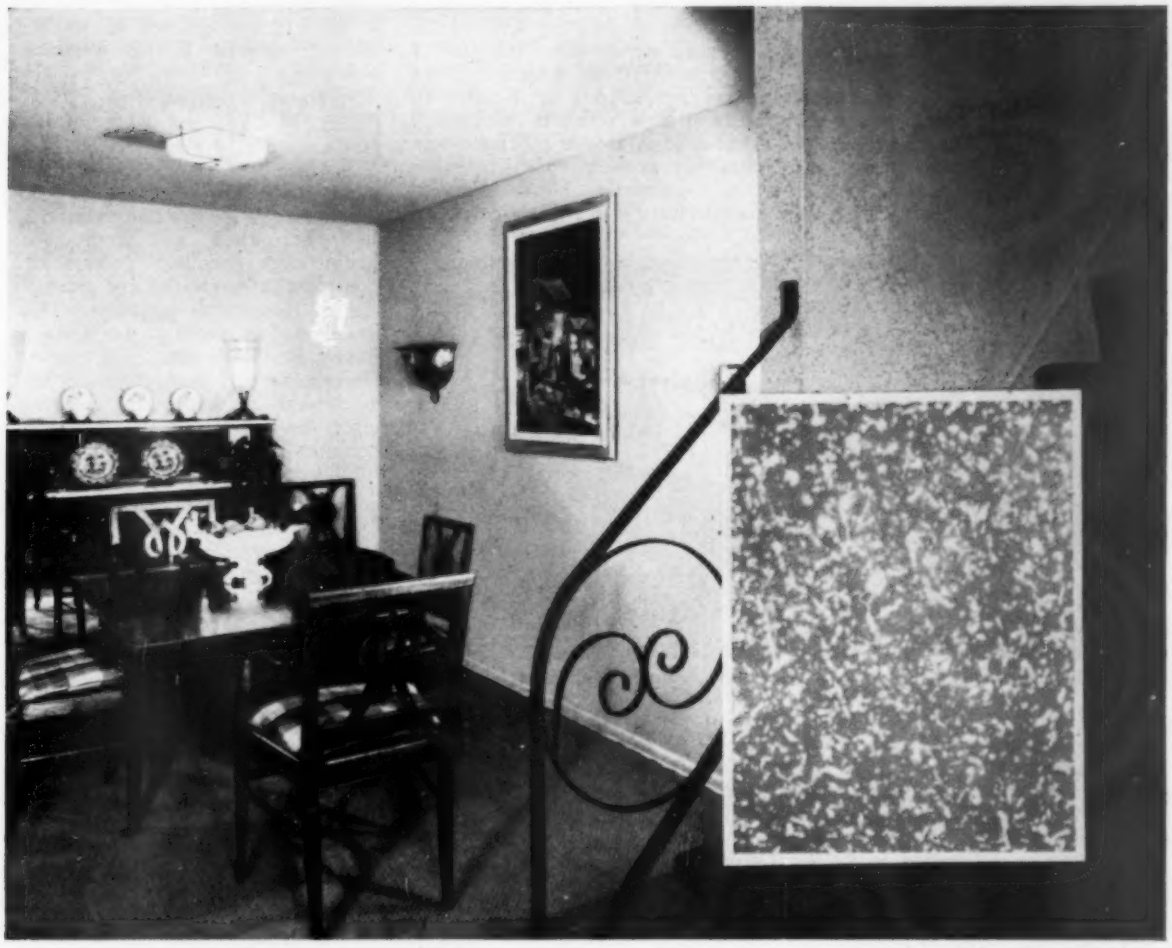
Coating machinery designed for use on paper, cardboard, textiles or metal foil will be on display on the stand of the Dutch agents for Zimmer Plastic Maschinen-Gesellschaft MBH, who are Werkplastic NV. These machines can be operated successfully with a very wide range of base materials and can use most thermoplastics including rigid and plasticized PVC, polythene and polypropylene, polystyrene, cellulose acetate and wax compounds. The design of these machines enables changes from one coating material to another to be easily and quickly made and the rolls are automatically cleaned.

Albert Stübbe Vlotho Maschinenfabrik are makers of a range of hydraulic single-screw preplasticizing injection moulding machines and three of these will be on the stand of Firma Merrem and La Porte NV. The complete range covers machines with shot capacities from 130 to 1800cc., and the largest of these has a mould opening of 75cm, mould plate dimensions of 102 x 102cm, and can produce 210 units per hour on a single impression mould. BIP Chemicals Ltd., are placing the emphasis in their exhibit on aminoplastic moulding materials manufactured under the trade names Beetle, Scarab and Melmex. A wide range of components moulded from these will be shown, also electrical mouldings and other items made from the new Beetle polyester dough moulding compounds. Advances in the two colour moulding of Melmex tableware will be indicated in the display which will feature the latest design trends and pastel colours.

BIP Tools and BIP Engineering are exhibiting elsewhere in the display and the tools will consist of a selection of moulds and mould parts covering injection, compression, transfer and other manipulation techniques. The machines include Bipel 20 and 80 ton fully automatic moulding presses, a 35 ton pelleter,



Stübbe Model S150/235VE hydraulic single-screw preplasticizing injection moulding machine with a shot capacity up to 235 cc.



Multicoloured finishes are better made with PLIOLITE VT!

So discovered the manufacturer of the paint pictured above as he set out to make the best multicoloured or " splatter " finishes he could. He succeeded by starting with PLIOLITE VT — the latest copolymer resin from Goodyear.

He turned to Pliolite VT, rather than the conventional material, for several reasons: 1. Dispersion properties that permitted good " splatter " formation; 2. Much pleasanter odour; 3. Far greater hiding power; 4. No need for special primers; 5. No lifting of the base coat; 6. Greater safety in manufacture and use; and, 7. An 80% saving in solvent cost.

If you're interested in multicoloured finishes, or any of a number of paints, you should know about Pliolite VT. For full details, see your Goodyear Chemical Distributor.

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CHEMICAL DIVISION

Pliolite-T.M. The Goodyear Tire & Rubber Company, Akron, Ohio, U.S.A.

Goodyear International Corporation, Chemical Division, Akron, Ohio U.S.A. The Goodyear Tyre & Rubber Company (Great Britain) Ltd., Chemical Division, 84 Salop Street, Wolverhampton.

a rotary drum preheater and a 4-6oz. injection moulding machine.

Draka Plastics, Amsterdam, market numerous products mainly extrusions using a variety of basic raw materials. These include Drakasaran thread extruded from polyvinylidene chloride used for car upholstery and, in the form of tapes, for seating in modern furniture and beds. Other applications are for deck chairs, garden furniture and sunblinds, polythene is used for production of Drakatileen sheeting, lay flat tubing for packaging and garden hose. The company is also engaged in production of foam materials for various applications made from PVC, polyurethane and polyether. The stand is to be a combined effort of Draka with its subsidiaries, the other firms being Polva-Nederland NV, who specialize in rigid PVC products and Veritex NV who will show coated fabrics and imitation leather in modern embossings and many colours and colour combinations.

The production of glass reinforced polyester yacht hulls is done on a large scale as may be seen in the illustration which shows the yard of Werkspoor NV in Utrecht. These hulls were designed by William H. Tripp of New York and considerable interest exists abroad in Dutch-built boats such as these.

An automatic blow moulding machine fitted with a newly developed extruder is to be exhibited by Elmex NV of Rotterdam. This is a Kautex-Werke machine and the extruder has a plasticizing capacity of 40kg/hr. and a worm diameter of only 40mm. Working at maximum speed which is 30 strokes per minute and fitted with two or even three heads the production capacity of the machine is very high.

Glass-reinforced polyester yacht hulls under construction in the yard of Werkspoor NV in Utrecht

Kautere - Werke automatic blow moulding machine with high-capacity extruder

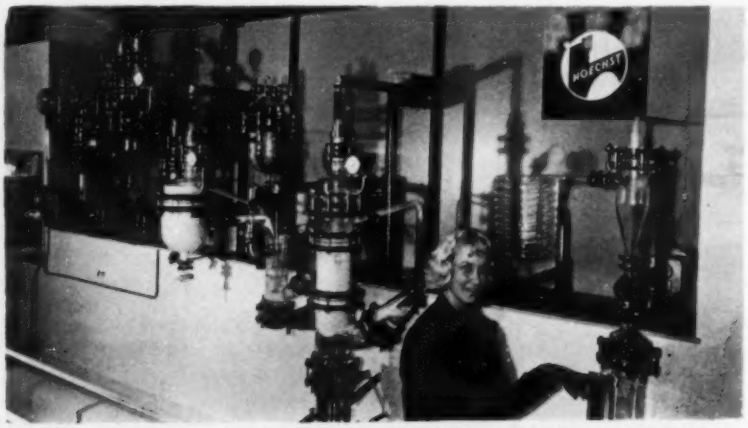
Among the raw materials manufactured by Dutch firms are those to be shown by Hollandsche Casolithwerken NV whose products include casein, polyesters and methyl methacrylate. The polyesters made by this firm are used largely in the production of buttons, display articles, furniture mountings and as an insulating material in the electrical industry.

Polythene, polypropylene, PVC, PTFE, PCTFE, and PVA are all products made by Farbwerke Hoechst AG which will be shown on their stand. The main attractions are expected to be the first two mentioned and the stand will feature a continuously operating polymerization plant demonstrating the production of Hostalen G polythene. This model won an award at the Brussels Universal Exhibition. A novel Hoechst process is to improve the mechanical properties of Hostalen pipes by bi-axial orientation and examples of these pipes will be exhibited.

Plasticonam Amsterdam NV are manufacturers of a very wide range of plastic items and although their speciality is the production of packaging materials, they also manufacture blown PVC bottles and containers, vacuum mouldings, and stitched or HF welded articles.

Bucher - Guyer, Niederweningen, Zürich, produce a range of hand operated, semi and fully automatic presses from a 35 ton model up to 500 tons, these have electronic control, are very robustly built and well designed and will be displayed on the stand of Werkplastic NV. Also on the same stand will be machinery of various types made by several German and Austrian firms including extruders and calenders from Joh. Kleinewefers Söhne, Krefeld, and two injection moulding machines with screw plasticizers which form part of the range manufactured by Maschinenfabrik Ludwig Engel KG, Schwertberg.

The Continator is a combined predryer and preheater, completely



Continuously operating polymerization plant demonstrating the production of Histalen G polythene, by Farbwerke Hoechst AG

self contained, which can be mounted on any type of injection moulding machine or extruder. This is a product of Continator I/S, Frederiksund, Denmark, and is also to be shown on a combined stand — that of Wilmod Compagnie NV — on which will be a variety of machines including a bench injection machine from S. R. Seymour and Co. Ltd., Rayleigh, Essex, EWK drying ovens, Nolma granulators and Thermofix made from Vestolen polythene, big containers of rigid Vestolen and a range of polyester mouldings. Another product on which the company has done much research is PVC foam which is expected to find many applications, particularly in the car industry.

It is of course not possible to mention all the products or firms which will be seen in this exhibition, but the information which has been published in this and previous issues of *RJIP* should be sufficient to indicate the diversity of machines and raw and finished materials with which the visitor to Utrecht will be faced, among which there must be much of interest apart from the relatively small number of items described.

Bucher-Guyer fully automatic press electronically controlled and hydraulically operated

fully automatic mould temperature control units made by Adam Rohè, Frankfurt.

The products of Th. Ammeraal's Eindloze-bandweverij consist of conveyor and driving belts of various types in PVC coated fabric based on nylon, cotton, terylene and other yarns. The majority of these are endless belts the many applications of which are well known.

Chemische Werke Hüls are manufacturers of some 800 different materials and their main plastics products are polythene, polystyrene, PVC and SBR synthetic rubber as well as numerous plasticizers, stabilizers, and other ancillary raw materials. Finished products made from CWH raw materials which are to be shown include fish baskets

Batch Still

A general-purpose batch still is to be designed and built by the chemical engineering division of the APV Company for installation at British Hydrocarbon Chemicals' petrochemical works at Grangemouth, Scotland.

It will be used for the separation of limited amounts of intermediate and product streams into closely cut fractions.

British SRF Black

CABOT CARBON PRODUCTION

CABOT Carbon Ltd. announced on October 4 the production of Regal SRF at their Stanlow, Chester, plant.

The new Regal process, patents applied for, claimed to permit the exact control of carbon black structure, has been employed to duplicate on the oil furnace process the characteristics Cabot American gas-produced SRF types, Pelletex and Sterling S. Cabot's low modulus, high elongation reinforcing oil furnace blacks, Regal 300 and Regal 600, initiated this process, and the former is already finding wide usage as a Channel black replacement.

Regal SRF is priced at 6¾d. per lb. nett ex-works, Stanlow, for minimum 3-ton deliveries, and 7d. for smaller quantities. Samples and information from Cabot Carbon Ltd., 62 Brompton Road, London, S.W.3.

Granbull Prodex Link

The Granbull Tool Company — the member of the Baker Perkins Group which makes tools for the plastics industry — has signed a sales and manufacturing agreement with the Prodex Corporation, of Fords, New Jersey.

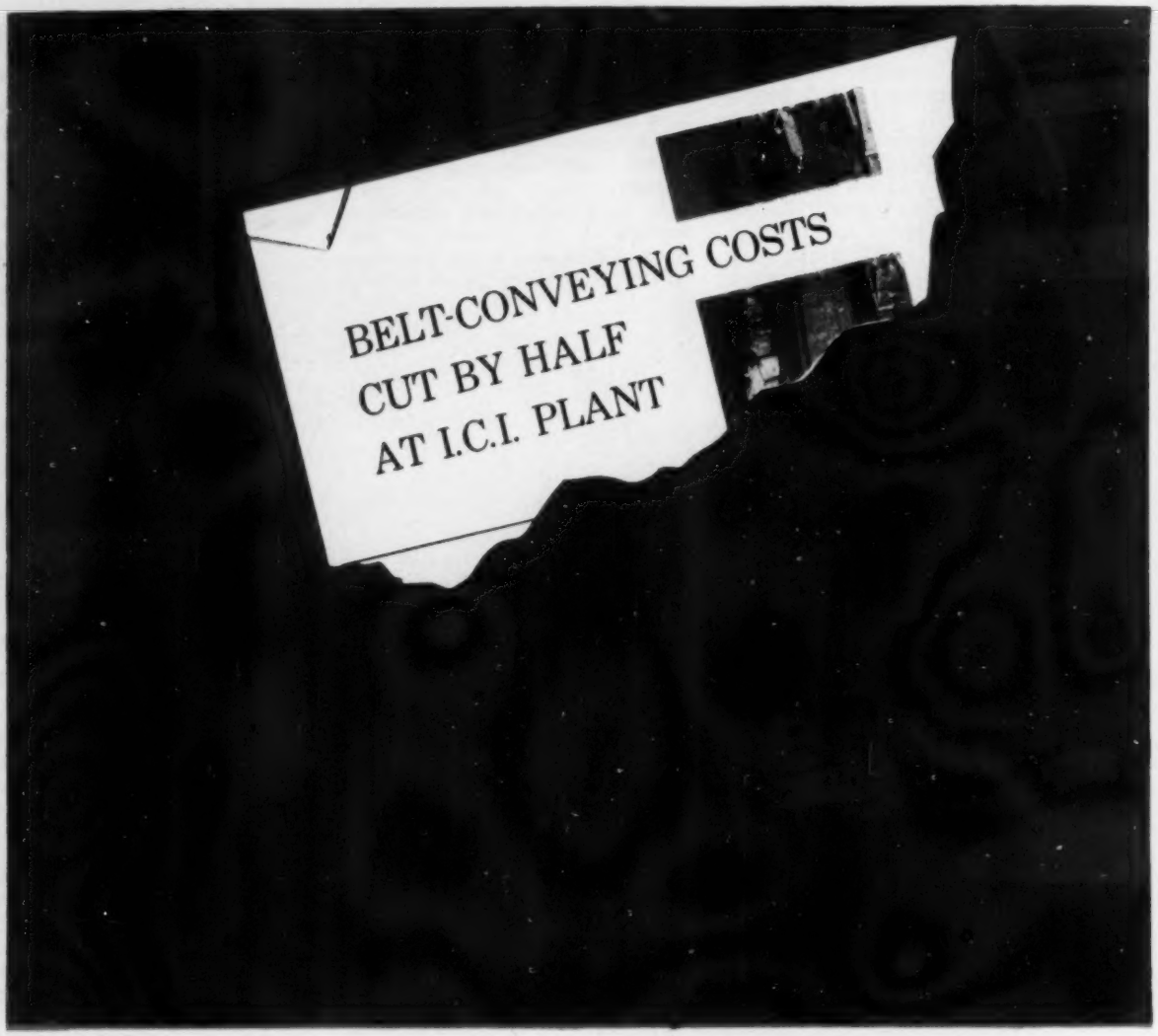
The British company will supply certain basic components in its range of blow moulding equipment for assembly and completion in the US. The Granbull units will be linked to Prodex extruders and sold throughout the North American continent. Prodex has already placed an initial order of over £40,000 for components.

NATURAL RUBBER RESEARCH

Continued from page 527

considerably by the kind of rubber and the method of adding it to the road materials.

The results of a systematic examination into the relative effectiveness of different kinds of rubber were described. In addition, the organization and execution of large scale road experiments carried out during recent years in Great Britain were discussed. It was emphasized that for such experiments careful design was essential, involving the inclusion of adequate control sections, the close control of variables such as the state of the rubberized binder, the temperature and time of mixing, and spreading technique. The results obtained from these trials and their implications were described.



Costs cut–

By installing a Butyl Rubber-covered conveyor belt at their Billingham Chemicals Plant, Imperial Chemical Industries cut the cost of belt-conveying phosphate fertilizer by half.

WORKING life quadrupled

Because of the heat of the fertilizer (about 115 degrees centigrade), its corrosive properties, and the usual damage from moisture and ageing, even the best synthetic rubber belts used previously have worn out in a year, after shifting about 132,000 tons. The Butyl Rubber belt was installed four years ago and has shifted 650,000 tons.

ESSO MEANS BUSINESS IN CHEMICALS

COST still going down

As the Butyl Rubber belt is still in perfect condition, and I.C.I. expect it to work indefinitely, belt-conveying costs will probably fall still further.

When ordering conveyor belting, it will pay you to specify

ESSO BUTYL

Esso Butyl is the man-made rubber with the longest flex life and the greatest resistance to heat, corrosion, ageing, ozone, moisture and tearing. (For handling especially hot materials, Esso Butyl covered belting is even more efficient on a 'Terylene' base.)

Esso CHEMICALS

For information about Esso Butyl Rubber, telephone: HYDe Park 7030, or write to Esso Petroleum Company, Limited, Chemicals Department, 50 Stratton Street, London W1

ESSO MEANS BUSINESS IN CHEMICALS

VIEWS *and* REVIEWS

IT is in the nature of time that it cannot in itself be saved, it must be spent. We can save only its equivalent (*e.g.* money) and business efficiency largely consists in doing just this, in producing or selling more in a given time.

This is perhaps nowhere more apparent than in building a new factory because capital is very expensive nowadays. A timely contribution to the problem of reducing capital charges by saving constructional time, is the article by H. Carl Bauman of American Cyanamid in 'I/EC,' Vol. 52, No. 8, August 1960. Pp. 47A-49A.

He begins: 'Of all the elements of the fixed capital cost estimate, figuring time is probably most important. Every day which can be saved in completing the project assures early return on the capital idling during the construction phase. For the chemical industry, turnover ratio is approximately 1 — a dollar of invested capital usually yields a dollar of annual sales. A delay of a month in bringing a million dollar plant on stream means a loss of about $90,000 of sales.'

Data already existing on some aspects of the problem, especially from studies on operation-times, is widely available in the literature. Naturally, local conditions influence results and building contractors are not likely to disclose their methods of calculation and the factors used in estimating these, indeed they constitute the working know-how, if not the trade secrets, of the contracting builders. Also, there are more imponderable variables such as weather, transport and other strikes, errors, delays, etc. Yet Mr Bauman has done an interesting and valuable piece of operational research by applying scientific methods to this general problem.

He comments first on the optimism of time-estimates of constructional works. 'A survey of a representative number of recently completed projects . . . showed that only 6% were completed ahead of schedule, 29% were on schedule or no more than one month late, 37% were up to six months behind schedule, and 28% up to 12 months behind schedule.'

As might be expected, it is the more complicated and costly projects which show the greatest departure from anticipated times of completion, and it is usually not the actual physical construction which is not completed on time but delays due to errors and omissions, and failures in equipment and materials encountered in starting-up the plant.

Again as might be expected, there is a reasonable co-relation between cost of project and constructional time and the graph which depicts it yields the following data:

Fixed Capital Value million dollars	Months to Complete Range	Median
1 and less	6-19	11
1 to 5	13-27	19
Over 5	19-42	27

An interesting passing remark of the author's which might be echoed in the UK too is: 'Projects contracted out for construction on a cost-plus basis were completed in two to eight months longer than those of equal cost let on a lump sum basis. The incentive advantage in the lump sum type of competitive construction bid seems evident.'

To ensure completion in the shortest possible time, it is imperative to work to a planned time-schedule and the paper includes a detailed chart based on such a schedule.

If the cumulative construction be plotted against time, an ogee or S-shaped curve is obtained, a typical rate-of-growth curve, as any biologist would have predicted. It is recommended that such curves be used to decide when and where a more detailed analysis is needed to overcome any revealed time-lag.

Bauman's final paragraph is an amusing reflection on human nature, which is apparently just the same on both sides of the Atlantic. He says, in effect, don't keep altering your estimated time-schedule in order to fit in with what actually happens; if there are big discrepancies either way, inquire into them, take extraordinary steps if need be to keep a badly-slipping schedule up to the estimate, and, if progress is noticeably better than the estimate, then alter the estimate, so reducing the cost and avoiding a complacent, *laissez faire* attitude which allows time (and therefore money) to slip through the grasp.

Long and Short Time-Effects

Time is also, of course, a parameter in most technical questions. There are two fields, at opposite ends of the domain of high-polymer technology, in which time is the outstanding factor: most chemical reactions and product endurance.

The ultra-rapid analysis of the products of photo-reactions seems to have been achieved by exposing the reactants to a very-high-wattage light-burst for a micro-second to start the reaction and then to follow this, after a somewhat longer time-interval of, say, a hundred-thousandth of a second by a fainter flash for spectroscopic analysis. In this way, intermediate products with an extremely small lifetime have been definitely identified. This flash photolysis has already been applied to certain inorganic and biological processes, and it would appear to hold possibilities in the study of initiation phenomena in polymerization.

At the other end of the time-scale (from the human point of view) are those reactions which proceed very slowly at ordinary temperatures and normal ambient conditions. I would call them 'ageing' processes if the word had not by now become debased to mean subjecting samples to severe, artificial treatments in laboratory apparatus. Instead, I will call them endurance reactions.

There is, of course, an extensive literature on the subject, and it is added to weekly. One aspect which is understandably receiving much attention at present is the long-period stress behaviour of polymers and especially of polythene.

Long Time No Creep

The *ASTM Bulletin* for July 1960, No. 247, carries, on pp. 64-68 (TP130-134), a paper by G. R. Gohn and J. D.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

Cummings of the Bell Telephone Laboratories on the 'Creep Characteristics of Compression-Molded Polyethylene.' These indefatigable researchers (if only our materials were as time-resistant!) have carried out tests, on three kinds of polythene, extending over 11 years, eight years, and one year.

The tests on the first type of polythene material were begun in 1947 and have now been discontinued after 95,000 hours (= 11 years) of continuous loading, on the second type (of higher MW) begun in 1950 have been discontinued after 70,000 hours (= eight years), and, on the third type, begun in 1958 are here reported after 8,000 hours (= about 10 months). All three polythenes were compounded with small proportions of carbon black and antioxidant, compression-moulded test pieces were made and submitted to continuous, extension loads of 50, 100, 150, 200, 300, 400, 600, and 800 psi, the percentage creep being measured from time to time.

Creep was discovered at all stress levels. Even at the low 50 psi on the lower MW material it had not virtually ceased until after 20,000 hours (= 2½ years). At the higher stress levels, even after 95,000 hours (= 11 years), a minimum creep rate was not established. As would be anticipated, the higher MW material showed a marked decrease in creep.

The authors conclude that, because the data show that times in excess of 40,000 hours are required to establish constant creep rates at all but the lowest stresses, it follows that equations used for calculating long-time creep from tests of short duration (1,000 to 10,000 hours, = up to 15 months) will give erroneous results if one of the parameters is a constant creep rate as determined at the short time.

Long Time on the Shelf

I see that task group No. 1 of sub-committee 15 of Committee D-11 of the ASTM has just been dismissed with thanks. It has been studying the correlation of oven and shelf ageing, has now completed 12 years of shelf ageing results and is seeking authority to publish them in the *ASTM Bulletin*. I shall look forward to them with interest but not hope.

It will be remembered that when the delights of roast pig were first discovered (as reported by Charles Lamb) it was found to be an expensive business to repeat the process because it involved burning down the house in order to roast the porker. But, says Charles Lamb, 'a sage arose who discovered the gridiron.' So in rubber testing. A sage discovered that the hot, ageing oven would accelerate the roasting of rubber. Unfortunately it was assumed — and it is sometimes implicit in modern discussions of accelerated ageing — that if it takes two hours to roast piglet A on the new gridiron and only one hour to roast piglet B, then piglet A would have lived twice as long as piglet B, but for the untimely intervention of the butcher.

Surely what the customer wants to know — and, after all, that is the real question because the industry lives by its customers and not by the curiosity of its inquiring technologists — is: how long will this product I am offered last in use? How long will it live? butcher and all, as you might say.

Maybe he is asking the wrong question but he has a right to do even that, paying the piper; if you want to play another tune, you must tell him that the only sure way of finding out how long a thing will last is to keep it until it falls to bits and if that takes many years (as it does with many rubber and plastics articles) you cannot answer the question for many years. Sorry, but there is no short cut if you want a reliable answer. The best ageing test you can do is to let your customer do it for you and leave the answer to your sales department.

They, of course, will give you an average figure because conditions of service vary so much. That indeed is why, for one reason, you cannot get a good laboratory assessment of endurance, because, try as you may, you cannot imitate service conditions and at the same time accelerate them, make them more severe. I know there is more to it than this but I have not enough space available this week; I will return to the theme. I notice that the same thing is said — though more elegantly — by E. W. Russell in his paper, 'Plastics and Rubbers under Extreme Operating Conditions,' now published in the *Transactions of the Plastics Institute* Vol. 28. No. 76. August 1960. 'It is natural that the user of these products requires some estimate of their potential life. This is frequently a matter of extreme difficulty and any prediction is governed by a large safety factor. Where the conditions of operation are complex, as they frequently are, the prediction of life is usually little better than inspired guesswork, until a considerable body of experience has been accumulated.'

Synthogenesis

I cannot forebear to quote another illustration of the hazards of prophesy without taking adequate regard of the time parameter. I quote from the excellently reproduced brochure just issued by the Rubber Research Institute of Malaya, describing its research and advisory work. In the course of an introductory note on the early history of rubber research in Malaya, the following quotations are reproduced.

From an address to the British Association in 1906 by Professor Wyndham Dunstan.

'The production of Caoutchouc by chemical means has been virtually accomplished in its formation from isoprene. The exact nature of this change has still to be determined. When this has been done it will only remain to cheapen the cost of production, to make the manufacture of synthetic rubber a purely practical problem.'

From an article in the 'India Rubber World' in 1908.

'Not that it is claimed that synthetic rubber will never be attained. It may be. But its first cost for years will probably make it only the plaything of the laboratory. Indeed, so far distant does the production of synthetic rubber seem, when one reviews the attempt towards its production, that it is safe to say that when it does appear the cradles of the land will also be filled synthetically.'

The brochure adds: 'Commercial production of "synthetic natural" rubber began in 1959.'

Query: 'What, then, has happened to synthogenesis?'

CHARLES JENNINGS

MEN and MATTERS

A Review of People and Events

by Peter Richards

LAST Saturday was a great day in Nigeria. After a night of celebrations, thousands of Nigerians crowded on to Lagos racecourse to see Princess Alexandra hand over documents establishing the sovereignty of the new independent state.

During the celebrations a new luxury hotel was opened in Lagos. Appropriately enough it is called the Federal Palace Hotel. A most important part of the luxury was supplied by one of Europe's foremost manufacturers of latex foam products — Bintex Ltd., of Harrogate. Mr H. McPhee, the company's export sales manager, tells me that mattresses and pillows were shipped out to the hotel some months ago. This order followed one from the Mainland Hotel in Lagos, which was equipped by Bintex some months ago.

Bintex Ltd. supplied nearly 300 5-in. mattresses and De Luxe pillows to the Federal Palace Hotel, Lagos, which opened during the independence celebrations (*see first story*)

Maltese Progress

Since the industrialization drive, which forms part of a five-year development plan, was launched in March by the Secretary of State for the Colonies, over 400 requests for information have arrived at the London office of the Malta Aids to Industries Board. As already reported in this column, Jablo Plastics Industries has formed a company on the island. A rubber company is also said to be concerned in negotiations.

'So far,' said Colin Bruce, London manager, 'nine applications for grants, loans, income-tax, holidays and other benefits have been approved, and exactly fifty other firm applications have been received. We are now doing everything possible to help all suitable applicants to bring their plans to fruition, while the necessary discussions go on before public money and other facilities are actually made available.'

'We estimate that the industries already approved will be giving employment to 1,550 people in three years' time; and this means we are already some way along the road to our initial target which is fresh employment for 5,000 people.'

Film Over Facia

I saw a novel use for polythene film the other week in London. A big block of offices above a coffee house in Cannon Street, near London Bridge, was having its stonework restored. The coffee house has one of these large neon-signed facias, which would certainly have been severely damaged if the proprietors hadn't protected it against the dirty water flowing down the side of the building.

Polythene film was used (Fablon 150 gauge I found) to keep out the wet and dirt—and it did not keep out customers, who were able to read the sign easily during alterations.

Plastics on a Pedestal

UK plastics are also taking part in Nigerian independence. The statue of Dr Azikiwe (pictured) has been made from glass/fibre reinforced Bakelite polyester resin by the Wimbledon firm of Mancini and Tozer. Dr Azikiwe is scheduled to become the first African Governor General of the Federation. The clay original, over life-size, was moulded by Ben Enwonwu, M.B.E., art adviser to the Federal Government's Ministry of Education. The statue is erected at Enugu, capital of the eastern region of Nigeria.

This statue weighs only 1cwt. compared with the 6cwt. of its plaster counterpart. Shipping costs were therefore reduced to a minimum.

Joins Anchor Board

Anchor Chemical Co. Ltd. have appointed S. A. Horobin to the board of directors. As a member of the board I understand he will continue his activities in the sales field as home sales director. Stanley Horobin joined the company in 1931; in the period prior to the war he studied at Manchester College of Commerce, Manchester Technical College and New-

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ton Heath Technical College where he obtained an L.I.R.I. diploma. His service with the company was broken in September 1939 on being mobilized. He served in Europe, the Middle East and Far East, where he finally attained the rank of Captain with a Royal Artillery Parachute Regiment.

He rejoined the home sales department as a representative in 1946 and subsequently was promoted in 1948 to home sales manager. During the post war period he has been active in a number of industries served by the company: he is a member of the Institution of the Rubber Industry, a member of the Oil and Colour Chemists' Association and an associate of the Sales Managers' Association. He has served as a member of the IRI Manchester Section Committee.

Beauty Behind Bars

Last week I was fortunate enough to be included in a party consisting mainly of Dutch journalists, which was taken on a trip to the huge works of Chemische Werke Hüls at Marl Kreis Recklinghausen. Let me hasten to say that the young ladies in the cage were not there either for safety or for the benefit of the party but merely to provide an interesting and attractive background for the wire mesh which is coated with Vestolit PVC, one of the company's products. The main plastics manufactures are polythene, PVC, polystyrene, polyester resins and SBR, and the whole works is an impressive example of the phenomenal growth of German industry since the war. Occupying an area of two square kilometres and providing employment for almost 15,000 people, the atmosphere is one of tremendous efficiency. The whole staff, executive and works alike, start at 7.30 a.m. and finish at 5.20, apparently work hard and look as though they enjoy it. Canteen and recreational facilities are excellent and a friendly feeling obviously exists between all staff levels.

The smiling faces of these young Germans make an attractive background to the wire mesh, which is effectively rustproofed with a PVC coating. *See Beauty Behind Bars*

BTR Industries Ltd. have announced three new senior staff appointments. J. A. Hardman has been made general manager of the belting division and D. J. Hodgson controller of research. The manager of market research and development is now L. W. Rodway.

* * *

Clinton B. McKeown, who had been general manager of manufacturing in B. F. Goodrich Aviation Products division, has been made division general manager.

Question Corner — 138

(Second Series)

463. How can wrinkles in blown film be prevented?

(Answer next week)

Answer to Question Corner — 137

462. Thicker gauge flat film over 0.10in. thick is called sheeting, the upper limit of which is about 0.25in. thick.

Extruders used for this type of sheeting are of the conventional type and may be converted for this work by changing the die and haul-off equipment.

The resin is fed to the extruder through a hopper, which may be of a mechanical or pneumatic type. A higher extrusion rate can be obtained by preheating the polymer, by means of a hopper loader dryer, up to about 60°C. Preheating also eliminates any moisture that may have condensed on the polymer during storage.

Generally, a screen pack consisting of 20-80-120 mesh is sufficient. However the actual screen pack depends on the type of extruder and the mesh needs increasing as more mechanical working on the polymer is required.

Sheeting is extruded horizontally from a die similar to that used for flat film extrusion, but there are two basic differences: the use of an adjustable choke, or restrictor, bar and longer die lands. Also, sheeting dies are usually more heavily constructed to reduce warping of the land dies. (Die lands are the parallel surfaces of the die jaws through which the material extrudes.)

The choke bar is an adjustable bar located between the manifold and the die lands to distribute the molten polymer uniformly. Used to smooth out large variations in gauge, the bar, after being first set at the beginning of a run, is not usually changed during the run.

(Another question next week)

Polly Ester Says . . .

'Refractive Index — a bent forefinger'

new cure for what ails output ... of bicycle and moped tyres

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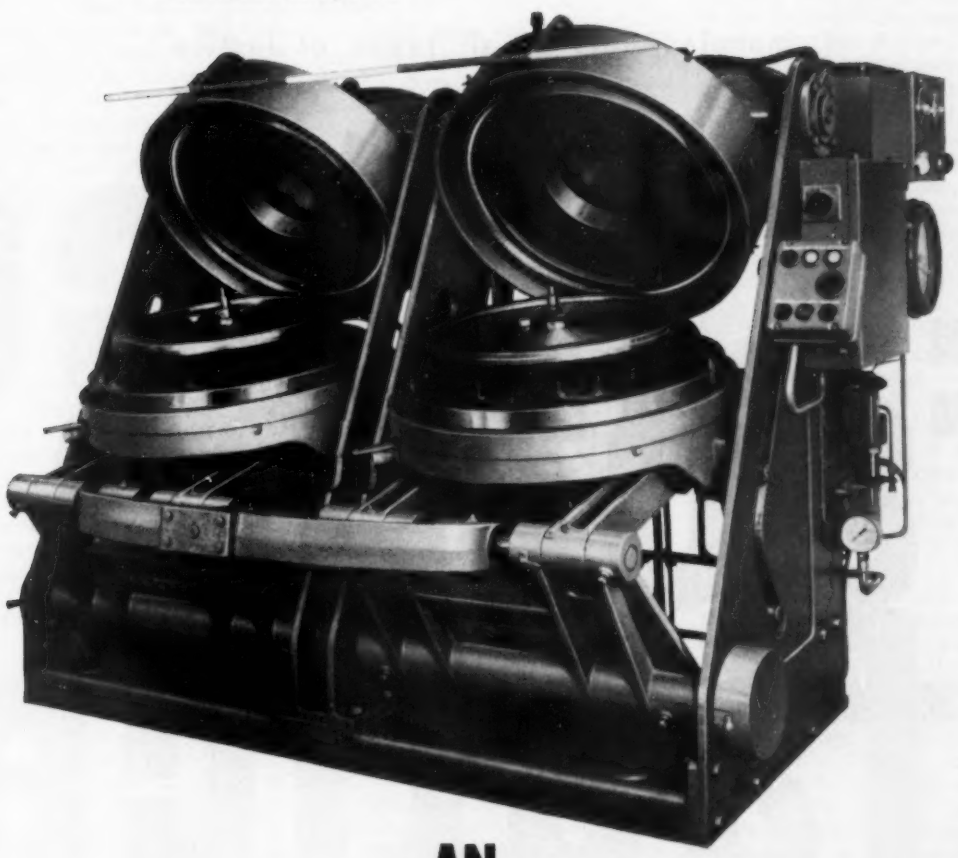

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AMERICAN LETTER

News of the US Rubber and Plastics Industries

from Norman L. Hewitt

THERE was a time in the early days of the New Deal when one could hear rumours that the Patent Office was shortly to be abolished. Today, there are members of this institution and of the Justice Department as well who probably regret that such an event did not occur.

This attitude would be quite understandable in view of the resolution this summer of several patent litigations which have greater import to the rubber industry than any similar happening of the past twenty years. In two cases, US district court judges have given decisions in favour of private industry over governmental contentions of non-patentability. The most far-reaching of these is the award to General Tire and Rubber of a patent claiming pneumatic tyres made from oil-extended SBR synthetic. Since 90% of all US tyre production contains at least some high Mooney SBR-oil masterbatch, the extent and value of General Tire's patent is obviously enormous. In 1950, when the process was offered to the Reconstruction Finance Corporation, President William O'Neil of General quoted a reported price of $65m. RFC (then producer of all GR-S synthetic) refused, even though the entire industry was at that time looking for just what General claimed for its process — a way to extend the supply of synthetic rubber by as much as 50%. Undeterred by this rebuff, O'Neil arranged to carry on the process with The Polymer Corporation of Canada, and it was the products of this collaboration which gave convincing proof that oil-extended GR-S was indeed a million (if not a 65 million) dollar discovery.

The decision by Federal Judge Alexander Holtzoff which ended a nine-year series of claims and appeals is based on, and gives a fine academic illustration of, the definition of things patentable. Generally, all patents are classified among the following types: an article of manufacture; a machine; a process, mechanical or chemical; a composition of matter; a design; a horticultural plant. Holtzoff ruled that while inventors Swart, Pfau and Weinstock had not demonstrated a new process in adding oil to GR-S, they had produced a novel and useful *composition of matter*.

In 1950, when the first of these novel masterbatches was made by General, most rubber technologists used oil in elastomer compounds either to improve processing or soften the vulcanizate. Those who wanted to reduce the rubber content in a formula (*i.e.*, extend the rubber) were not likely to have considered the use of large amounts of oil. They would have turned to reclaim, resins, factice ('sub') or mineral rubber. Only a few with long memories or extensive files would have recalled a paper published in the November 1942 issue of *India Rubber World* which described natural and reclaim stocks containing 50 parts of a petroleum base 'extender.' This product was called Naftolen and the author was Fritz Rostler. Dr Rostler had arrived in the US in 1938 from Austria bringing the specifications of an unsaturated petroleum hydrocarbon oil. His paper showed that in compounds containing 50 parts of smoked sheet, 100 parts of reclaim and 55 parts of channel black, additions of 30 and 50 parts of Naftolen could be made without incurring an excessive loss of tensile strength and abrasion resistance.

This paper, together with the fact that Dewey and Almy Chemical Company had helped Rostler's Wilmington Chemical Corporation to produce two batches of Naftolen-extended GR-S in 1942 and 1943 formed the backbone of the Patent Office's case which denied the patent on the grounds of prior art. As far as the novel process aspect was concerned, there was no denial by Judge Holtzoff that the concept of extending elastomer consumption through the use of large amounts of oil was anticipated by Rostler (and possibly by Jennings in a United Kingdom patent in 1947). However, the facts that (1) the necessity to use ultra-high viscosity GR-S was not stressed and (2) a vulcanizate of enhanced abrasion resistance was not obtained previous to General Tire's disclosure led the Court to grant the 50 claims of the application. To an impartial observer, the most compelling fact of all is the immediate acceptance and production of oil-extended GR-S by the entire rubber industry once the technical details of the General Tire process became known. If the Rostler-D and A materials were a legitimate anticipation, why didn't the rubber manufacturer grasp the benefits of oil extension ten years earlier — at a time when the need was even more acute?

The ruling was followed by the usual speculation that there would be another appeal. However, it now appears that the Patent Office and Justice Department will rely only on a pending suit, similar to that of General Tire, brought by United States Rubber Company to obtain their own oil-extended patent. This blocks any immediate action by General Tire to seek royalties. The US Rubber case is, of course, an 'interference' to General's claims. Thus, for the present, and perhaps a long future of creeping legalities, the oil-extended patent prize remains in limbo.

A second case which continued the trend of private control of technological development was Federal District Court Judge McCarraghy's ruling that the B. F. Goodrich Company was entitled to full and exclusive patent rights to its process for Ameripol SN. This is a polyisoprene introduced by Goodrich about five years ago. In bringing suit against Goodrich, the Government claimed the process was developed under a government contract, and was thus in the public domain. The company contended, successfully, that the essential features of the process (which involves Ziegler catalysts derived from trialkyl aluminum and titanium tetrachloride and is revealed in British Patent 827,365) were developed independently of the government programme. Goodrich president J. W. Keener has indicated that licensing of Canadian and US manufacturers is envisioned at a maximum royalty of 2½% of net sales.

The Newest Plastic

The ABS plastic in the railroad refrigerator car door liner in the accompanying picture is, of course,

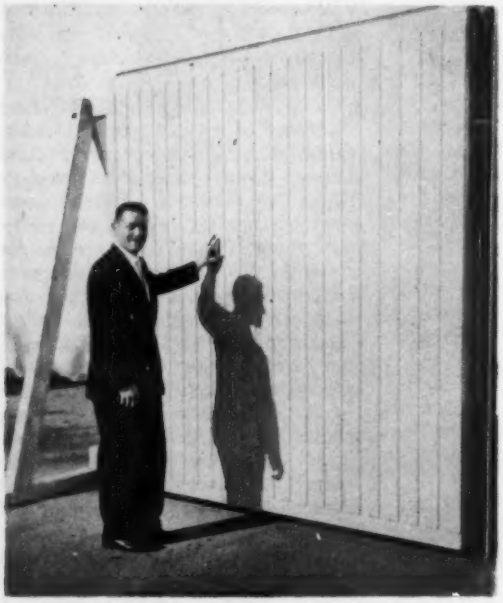
not the newest plastic. Indeed, the announcement of any 'newest' in this prolific industry would have to appear in a daily rather than a weekly publication, if the stigma of stale news were to be avoided! The newness associated with the Acrylonitrile-Butadiene-Styrene material lies in its accelerated acceptance as a distinct plastic type, which provides a unique balance of toughness, wide temperature range, excellent resistance to chemicals and weathering, and good electrical properties.

For the several years during which Marbon Chemical and US Rubber have been producing ABS materials (as Cycolac and Kralastic, respectively) there has been a tendency to regard these resins as types of high-impact styrene. The comparison of properties given below, as well as their service record, show that such a sub-classification is definitely not justified. Evidently, this opinion is now taking firm hold throughout the industry, for Goodrich Chemical has recently announced the start of production of its own line of ABS polymers (to be called Abson) at its Akron, Ohio plant. This move follows several months' trial marketing of an ABS resin designated Polyblend

The 1025 refrigerator car door liners installed on the cars of the Pacific Fruit Express Company provide a spectacular success for ABS plastic; they are also an important new example of the continuing replacement by plastic of wood and metal in the construction industry. There are two materials involved in the liners; in addition to the Cycolac ABS shell which appears in the illustration, Dylite expandable polystyrene (89lb. of it) fills the core space to provide rigidity and insulating value.

The manufacture of the nine-foot square doors which represent the largest mouldings ever made of an ABS plastic, required a good measure of engineering skill and innovation. Sheets of Cycolac ABS, one-half inch thick, are extruded by Jet Plastics of Los Angeles for the Santa Clara plant of Landis Industrial Company where the sheet is formed into the door shells by the largest commercial vacuum-forming machine in existence.

The large sheet is fed into the machine by means of a roller conveyor. Once in the machine, the sheet is secured and then enters the oven where it is heated on both sides, by



Door shell of Cycolac (acrylonitrile-butadiene-styrene resin) vacuum formed for Pacific Fruit Express railroad refrigerator car door

89001. Although capacity has not been revealed, the current total ABS market estimate of 30-35 million lb. indicates a probable factory size of 10 million lb. per year. Monsanto is another likely possibility to enter the ABS field in view of its announced increase in styrene monomer capacity to 600 million lb.

electrical resistance rods for 60 seconds. The upper heating elements are 10in. from the sheet, the lower elements 24in. from the sheet. This short heating time is possible because the oven has a door that closes after the sheet enters, thus permitting faster heating than is possible with most forming machines. After heating, the sheet is placed in position for the inverted forming operation. The male mould, which actually forms the door shell, then descends, pushing down on the heated sheet until the mould reaches its lowest position. At this time, vacuum is applied, firmly securing the sheet to the mould. After a short cooling period, the formed part is removed from the mould and leaves the machine on the same roller conveyor that introduced the original sheet. The entire forming operation of one ten-by-five-foot sheet takes only two minutes and is completely automatic — the heating, forming and cooling cycles occurring with pre-arranged timing. Two formed sheets are then butt-jointed, fastened with staples and adhesive-welded to form the finished door shell.

In addition to the refrigerator car door, other less striking but significant uses of ABS plastics include auto dashboards (Fiat), appliance housings, coloured telephone hand sets (latest Western Electric Specifications), lawn mowers, luggage and sporting goods.

One of the best methods of evaluating a new plastic is to place a list of its properties side by side with those of comparable and competitive materials. Following this procedure, one finds four plastics which closely resemble the medium-impact grades of ABS: nylon, acetal (du Pont Delrin), polycarbonate (G. E. Lexan) and high-impact polystyrene. Of these, only polystyrene is lower in cost. The others range from two to three times the price of ABS on a volume basis. Impact strength is one of the chief virtues of ABS and in this property it is surpassed only by polycarbonate. Those grades of polystryene which are of comparable impact strength have sacrificed physical properties and heat resistance. Although nylon has a higher degree of heat resistance and can be used at higher temperatures (under low stresses), the ABS types do not suffer from nylon's characteristic moisture sensitivity. On a performance basis, Delrin is the material which is most competitive to ABS resins. Like nylon, it has a definite high temperature advantage as well as higher strength, rigidity, and hardness. However, long term test data indicate that ABS is superion to Delrin in creep resistance. Electrical properties and resistance to chemicals and weathering are relatively good. The combination of low cost, well-balanced physical properties, and the ease of moulding which produced the refrigerator door liner all justify the

classification of ABS resins as 'new plastics.'

Plastics *vs.* Paper

A man grasped a paper cup of freshly poured hot coffee, winced, and hurriedly returned it to the tray. The liquid which had spilled on his hand was scarcely more painful than the burn his fingers had received through the paper. Had this fellow only been familiar with recent events in the plastics industry, he would have received great comfort from the knowledge that the day of the hand-burning paper cup is nearing its end. A new form of polystyrene, comparable in weight, cost, and strength, and infinitely superior in insulating quality, is about to replace paper in the manufacture of throw-away cups.

Expanded polystyrene (Kopper's Dylite) has been supplied in the form of minute pentane-containing beads for several years, but it is only within the past few months that the process of sheet manufacture has appeared. The production of sheet involves the use of a conventional blown film extruder, equipped with especially designed dies and take-off equipment to control expansion width and densities. The Dynafoam Corporation (associated with The Channel Master TV firm at Ellenville, New York) was probably the first to produce the kidskin-like material, but three others soon announced large scale plans which envision the capture of the paper cup and other markets for new styrene films.

The Monsanto entry, called Santefoam, has been accepted for food packages by the Food and Drug Administration. The material is being priced in a range from about $4.00 to $7.00 a 1,000 sq. ft., depending on type and quantity, and is to be made available in thicknesses from .010 to .030in. and in rolls 36in. wide and up to 7,000ft. long.

The Automatic Canteen Company, largest operator of vending machines for hot and cold drinks, will form a separate plastics division to produce the polystyrene cups for the vending market (something over four billion cups each year). Machines capable of producing 30,000 cups per hour will be part of an automated production line which extrudes and forms all types of film and cups continuously. Initial production is now turning out six and nine ounce cups for the company's own vending machines.

A most significant climber on the expanded styrene cup bandwagon is the Scott Paper Company, evidently acting on the principle that 'If you can't lick 'em, join 'em.' Scott will spend over $3m. for a new plant at Eddystone, Pa., to make cups as well as the plastic material Scott has trademarked Scottfoam, used primarily as a laminate on fabrics and as an air filter.

Internecine Feuding

Last June, a visitor to Akron was mystified to open the daily Beacon-Journal and find a full page Goodrich Company advertisement urging people not to buy cheap tyres. In this now famous presentation, the picture of J. Ward Keener, President of Goodrich, appeared, voicing a protest against the claims of rival companies that third line tyres were safe for high speed turnpike driving. The Goodrich ad specifically refuted the contention that the only difference between a first and third line tyre is the length of service life. Goodrich maintains that the thinner and cheaper tread not only causes faster wear, but also increases the chance of sudden failures.

What motivated this surprising dissension at the axep of the rubber hierarchy? A few years back, third line tyres accounted for only 15% of dealers' sales; today the figure has risen to 35%. The fact that both Goodyear and Firestone have been more active in this area with their recent introduction of $11.99 third lines containing nylon carcasses is probably a motivating factor in President Keener's attack. This is not to exclude recognition of Mr Keener's concern for the welfare of the motoring public. One simply realizes that business behaviour follows profit rather than ethical motives, the Harvard Business Review's preoccupation with 'business ethics' to the contrary notwithstanding.

Although the advertisements, which appeared in many magazines and newspapers, represented a direct appeal to the buying public, its major impact fell on the tyre dealers. Accordingly, most vocal repercussion has revolved around this group. Both Goodyear and Firestone replied to Goodrich charges in letters to their dealer organizations with the following points:

Firestone was the first tyre company to develop the selling technique 'to diagnose, prescribe and sell.' Goodyear, referring to the BFG admonition to buy the right tyre for the service needed, said: 'This is simply following the basic selling programme that Goodyear originated and has advocated for so many years.' Both defendants pointed out that 54% of the tyres in question are bought by people who earn less than $6,000 and are not able to afford higher priced tyres. (To which E. F. Tomlinson of Goodrich had a ready answer: 'This view assumes that such people did not place a high value on safety, that "life is cheap" to those earning $6,000 or less.') Naturally, Goodyear and Firestone called attention to their accuser's own third line tyre selling for an equally low price and advertised in equally glowing terms. The Goodrich answer to this again summed up their position: 'We have no argument with low price tyre advertising; we believe that low price tyres are not good enough for high speed service.'

There the argument stands, and if the Goodrich third line sales will only climb a bit, we'll probably not hear of the matter again.

Shaw Appointment

Francis Shaw and Co. Ltd. announce that, following the decision of their chief engineer, Mr H. Kaiser, to take up an appointment with the Douglas Aircraft Corporation at their European Headquarters in Holland, they have appointed Mr R. E. Hoyle, M.A., (Cantab.), A.M.I.E.E., to the position of technical manager.

Mr Hoyle, until recently sales manager, joined the company as a project engineer and has had wide experience of engineering in the rubber and plastics industries. He will be responsible for the engineering department and for the work of the team of project engineers who specialize in various sections of the company's wide range of products. He will also be responsible for supervising engineering now being undertaken by the company's manufacturing associates and licensees in Canada, Australia, United States, France, Holland and Italy.

More Mileage Tyre

Firestone Tire has introduced a new first line tyre which, it claims, will provide more mileage than its previous casings. Firestone's announcement follows similar new first line tyre disclosures by Goodyear and B. F. Goodrich.

Polyester plastic sheeting for use initially as electrical insulation and for packaging of frozen foods, is being manufactured in USA from a new polyester resin, made by Eastman Chemical Products.

TO LESSEN YOUR MOULDING PROBLEMS

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THE CHEAPEST MOULD RELEASE AGENT AVAILABLE AT HIGH PERFORMANCE LEVEL. WHITE COLOURED CONCENTRATE TO BE DILUTED AS LOW AS 2%. IT IS STABLE AND SAFE TO HANDLE. NO DISCOLORATION. ALSO SUPPLIED WITH SILICONE ADDITIVE

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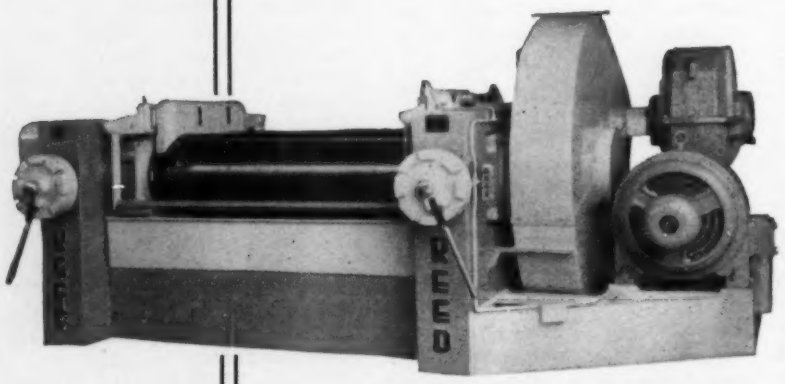

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Plastics Convention at Helsinki

THE FINNISH PLASTICS ASSOCIATION CELEBRATES 20 YEARS' PROGRESS

In the dark days of October 1940, 12 of the 15 plastics firms then operating in Finland met to form the Finnish Plastics Association. But it was not until 1943 that it was possible for Mr Alhopuro of the moulding firm of Sarvis to call the second meeting. From then on, The Finnish Plastics Association has a record of progress of which they may be proud.

In 1956 they were able to stage an international plastics exhibition on a large scale, and now, in 1960, in celebration of their twentieth anniversary they have held an International Plastics Convention in Helsinki and participated in the Finnish Industries Fair with 50 plastics exhibitors taking part.

The Conference opened in the beautiful auditorium of the Helsinki School of Economics and Business Administration on September 14, with a review of the Scandinavian plastics industry by Mr Olli Ollila of the Finnish Ministry of Trade and Industry. This was followed by a review of the last half century of progress in the plastics industry by Dr Hansjurgen Saechtling representing the German plastics industry.

Dr Murard of Pechiney presented a paper on the use of PVC and its copolymers in the building industry, supported by an excellent colour film made in collaboration by Pechiney, St. Gobain, Kuhlmann and Solvic.

Dr E. G. Williams of I.C.I. gave a fascinating paper on the history of high pressure polythene including some illuminating personal reminiscences of the early experiments by I.C.I. Alkali division, in which Dr Williams took part, leading to the discovery of a material which Dr Williams predicts will shortly reach the one million ton per annum production level.

Papers were given by Mr E. E. Merrill of Dow on the fabrication and application of styrene plastics, and by Dr Carl Mehnert of Hoechst on the uses of high density polythene.

On the second day of the conference, Mr Svenjansson of Svenska Metallverken discussed the importance and applications of the extrusion process and Mr Hans Beck of BASF discovered recent developments in injection moulding.

The last paper was a review of recent developments in plastics by Mr Olle Jonsson of Omex (Sweden) and the conference was closed by Mr Ensio Alhopuro, Chairman of the Finnish Plastics Association.

Scholarship Fund

In the afternoon, a meeting was held to celebrate the twentieth anniversary of the Association, at which it was announced that a scholarship fund to enable young workers in the plastics industry to take advanced specialized education had been set up and endowed by the member firms.

On September 16, the Finnish Industries Fair, including the Finnish Plastics Exhibition, was opened by Mr Kekkonen, the President of Finland.

The most notable feature of this exhibition was the replacement of the cheaper forms of ceramic and glass housewares by plastics mouldings embodying the best features of contemporary Scandinavian design; the translation from the traditional ceramic and glass materials to melamine and ABS has been achieved without sacrifice of form or function. This trend is apparent throughout the Scandinavian glass and ceramic industry, but is nowhere more marked or more successfully exploited than in Finland. The designs exhibited by Sarvis, the largest of the Finnish trade moulders, were particularly good.

Suomen Synteesi introduced for the first time its acrylic sheet made in Finland from imported monomer. This is the first production of acrylic sheet in Finland.

While the exhibition was strongly biased in favour of domestic articles — in this connexion the excellent display technique adopted by O.Y. W. and H. Chemicals must be mentioned — a technical application of great interest was displayed by Plastex in the shape of sintered low density polythene vessels in sizes as large as 1,600 litres. The sintering is done by a new process developed by Plastex over the past three years.

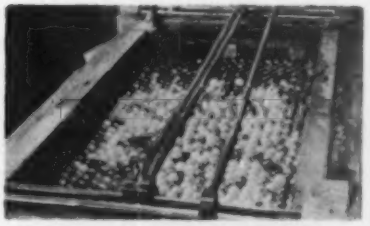
Research May Break 'Yield Barrier'

FUNDAMENTAL research and research on problems of immediate practical interest must be relentlessly carried on in order to ensure that natural rubber can compete with synthetic rubbers in price, quality and usefulness, Mr Cheah Theam Swee said on October 1. Mr Cheah, assistant minister of commerce and industry, was addressing the closing session of the natural rubber research conference in Kuala Lumpur.

He said: 'We note with particular pleasure the presence at this conference of representatives from the rapidly expanding synthetic rubber industry. We are proud that our work of natural rubber research has been of assistance to them. We in turn are now getting leads from them in producing new types of rubber for special purposes.'

Mr. Cheah said the contributions to this conference had given clear evidence of the great progress made in improving and controlling the properties of natural rubber and in reducing production costs. There was no doubt that with more intensified research and with better tapping techniques and the use of yield stimulants, there was, he believed, every possibility of getting commercial production of well over 2,000lb. per acre per annum.

He would even go further to say that he confidently looked forward to the day when the natural rubber scientists would be able to break the 'yield barrier,' and hoped eventually to achieve yields of perhaps 3,000lb. per acre per annum.



Chroffles are used in plating and pickling tanks—in for example the printing industry—where they float on the surface of the liquid and form an inert blanket. This minimises spray and splashing and reduces heat losses. These chroffles are blow-moulded by Lacrinoid Products Ltd. in Rigidex high-density polythene

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ANTILUX

Highly-effective protector against light-crazing and the effects of weathering in compounds based on natural and synthetic rubbers.

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The ANALYSIS of RUBBER AND RUBBER-LIKE POLYMERS

☆

R.A.B.R.M. MANUAL No. 3

By WILLIAM C. WAKE
M.Sc., Ph.D.(Lond.), F.R.I.C., F.I.R.I.
HEAD of CHEMISTRY DIVISION
RESEARCH ASSOCIATION of BRITISH RUBBER MANUFACTURERS

THE first modern work devoted solely to this important subject to be published in the English language. In addition to the analysis of natural and synthetic rubbers, the author deals with rubber-like plastics such as Polyethylene, PVC, PVDC, PVA and Urethanes. Also discussed are the identification of compounding ingredients used in the manufacture of rubber and rubber-like polymers.

It will unquestionably become a standard work and is a "must" for all analysts interested in this subject.

CONTENTS:

Extraction Procedures - Qualitative Analysis for Polymer Type - Elemental Analysis of Extracted Polymer - Direct Determination by Functional Group Analysis - Solution and Dissolution Methods - Quantitative Cracking and Distillation Methods - Carbon Black in Rubber - Ashing, Wet and Dry, and the Determination of Trace Metals - Analysis of Extracts and Blooms - Statistical Aspects of Analytical Work.

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Rubber Statistics

MALAYA — THAILAND

MALAYAN rubber production in August totalled 61,991 tons, according to statistics released here. This compares with 62,613 tons in July.

Imports during the month amounted to 3,675 tons against 4,888 tons in July, and exports to 59,754 against 54,997.

Stocks at the end of August were 87,228 tons against 83,578 tons — revised — at the end of July. August stocks comprised in dealers' hands 64,235, on estates 16,514, and at ports awaiting shipment 6,479.

Local consumption in August totalled 581 tons against 559 in July. Statistical errors and omissions were 1,566 tons against 379, while losses by fire and accident totalled 115 against 101 in July.

Thailand

Thailand exported 7,579,213 kilos of rubber of all grades in July, compared with 11,372,320 kilos in June, according to trade estimates.

Destinations included (in kilos):

	July 1960	June 1960	July 1959
US	2,770,450	4,622,239	15,601,468
Japan	152,109	2,585,005	2,525,182
West Germany	1,204,239	1,488,776	280,195
Singapore	814,855	836,799	2,090,225
Malaya	315,096	646,130	378,513
Czechoslovakia	508,029	609,635	—
Soviet Union	304,819	406,426	812,851
Hong Kong	13,041	39,123	86,554

Switzerland

Swiss rubber imports in August totalled 1,152,509 kilos, compared with 1,557,327 in July, according to the Swiss Customs Directorate.

Details were as follows (in kilos):

	August	July
Raw rubber	572,902	605,708
Synthetic rubber	477,026	814,582
Regenerated rubber	30,000	2,300
Scrap rubber	72,581	134,737

Main suppliers of raw rubber were Malaya, with 387,809 kilos, Ceylon, with 68,514 kilos, the UK, with 52,700 kilos, and Indonesia, with 40,843 kilos. Main suppliers of synthetic rubber were the US, with 374,302 kilos, West Germany, with 25,873 kilos, and Canada, with 24,171 kilos. Of the regenerated rubber, 24,000 kilos came from the UK and 6,000 kilos from West Germany. Scrap rubber deliveries included 69,206 kilos from West Germany and 3,375 kilos from France.

Stockpile Report

The select committee on estimates 'are not satisfied that adequate weight has been given to the interests of the exchequer' in the disposal by the Board of Trade of Surplus strategic stocks. They did however add that some products, including rubber 'broadly speaking were sold when prices were high.'

In a published report, the committee say they consider that this is due partly to the way in which obligations have been interpreted and partly to the methods adopted for disposal.

They recommend that 'the policy and present methods of disposal should be examined with a view to expediting sales of the remaining stocks at prices which safeguard the interests of the Exchequer without conflicting with the obligations of the UK.'

This new flooring, Ceramaflex, has been developed by the U.S. Ceramic Tile Co. It consists of individual 1in. square ceramic tiles firmly anchored in 9in. square rubber grids made from Goodyear's Plioflex rubber

IRI Exams

1960 DIPLOMA RESULTS

THE diploma examination results of the Institution of the Rubber Industry have now been released. The pass list 45% of the Associateship Examination is:

Associateship Examination

D. Baker, P. Bennion, V. J. Bidmead, B. R. Clayton, B. G. Crowther, B. Hodkinson, A. H. Hopkinson, C. R. Kemp, P. J. L. D. King, D. Lawson, C. Livingstone, P. W. Milner, K. L. Ong, R. E. Powell, R. W. Sambrook, V. Short, G. C. Sweet, S. P. Walker, A. C. Ward, M. G. Willie. S. P. Walker and D. Lawson were prizewinners.

Passes in languages were.

French and German

J. M. Mensing, S. Popovic, M. Rhodes, J. P. Russell, R. H. Smith, T. A. Sudlow.

FRENCH

R. B. Baker, P. R. Bodsworth, D. Brister, H. F. A. Capsey, P. Chaffin, B. E. D. Chart, R. Cole, D. C. Coulthard, P. A. Crozier, B. M. Gillett, T. Hanrahan, E. Hawkins, C. J. Higgins, A. J. Huskisson, C. A. Maston, A. A. McNeish, J. Morris, J. S. Pitman, D. Pritchard, G. H. Schuler, J. J. Siney, G. T. Sisley, J. J. Stone, G. F. C. Telling.

GERMAN

R. A. Aiken, R. Bennett, A. T. Blunt, D. A. Booth, G. Butland, J. E. Diamond, R. Drew, H. M. Dunford, R. Dyke, F. J. Eaton, J. B. Field, R. R. Heathfield, R. Hill, M. J. Irving, C. T. Jones, R. H. Jones, L. I. Laud, A. Lee, A. D. Logan, C. J. Moore, C. J. Nicholass, D. C. Pryce, K. J. Rimmer, A. J. Smith, J. M. Stacey, C. S. Subramaniam, D. J. Threadingham, B. G. Watkins, I. M. Whate, P. J. Wright, A. J. Young, M. T. Zemanek.

Passes in the Licentiateship examination (19%) were: K. Ascroft, J. Berry, G. C. Blackshaw, B. A. R. Brown, P. T. Downham, P. J. Farrell, D. J. Hill, M. R. Horton, H. Jupp, P. H. Kellett, B. W. Phillips, E. H. Quam, M. Robson, R. Sinnott, W. A. Stenton, B. Taylor. Licentiateship prizewinners were: P. T. Downham (1st prize) and P. H. Killett and E. H. Quam (2nd prizes).

The pass list of the International Diploma Scheme includes successful candidates from Spain: L. Agullo Esteban, A. Soler Amor, M. Roig Gimeno, R. Llorens Badia; and from Switzerland: H. Widmer, A. Giezendanner.

Construction of a $2.5m. aromatics extraction plant at British American Oil's Montreal East refinery will provide work for a labour force of over 200 men during the winter months.

Book Review

SYNTHETIC RUBBER TECHNOLOGY.—By W. S. Penn (London: Maclaren and Sons Ltd. Price 50s.)

As the author of this volume states in his preface, a number of books have previously been published on synthetic rubbers but these have been based primarily on the chemistry of their manufacture and have given a very incomplete treatment of their compounding and processing.

Both students and practising technologists have long felt a need for a comprehensive book on these aspects of the subject, and Mr W. S. Penn is to be congratulated on tackling the task.

However, it seems a pity that the book has been confined to synthetic rubbers. Why should natural rubber be left out? In selecting a rubber for a particular application the general purpose synthetic rubbers and natural rubber are nowadays on an equal footing and ought therefore to have equal treatment in a book of this type. From the students' point of view also it would seem very desirable to treat these rubbers in an identical way.

The general conception of the first two chapters of the book on 'General laboratory and factory practice' and 'Choice of polymer' is very good, but these topics could usefully have been dealt with in more detail. There are, for example, a number of important properties such as rebound resilience and tear resistance missing from the table on page 14. The selection of the most suitable rubber for a given application would also have been facilitated by inclusion of more detailed information on the useful working range of each rubber for some of the more important properties such as heat and cold resistance.

In the main body of the book, the compounding of each of the main rubbers is treated adequately. This section would have been even more useful had a more liberal use been made of tables or graphs to illustrate the general effects of ranges of loadings of the most important fillers, and the excellent detailed consideration of neoprene compounding for optimum performance in various properties extended to the other rubbers too.

The selection of optimum cure is relatively easy with natural rubber compounds since the curves of tensile strength and modulus against time of cure in most cases show clear optima. With synthetic rubbers this is not the case, both of the curves mentioned tend to flatten out or go on rising slowly with 'overcure.' In view of this, the selection of time of cure for any given product is more difficult than with natural rubber and very little has been published on the subject; perhaps this is why Mr Penn has not gone into it very thoroughly.

In spite of these minor criticisms I feel that this volume will be found most useful to a great number of practising technologists as well as forming a text book for senior students of the subject.—R. C. M.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

July

RUBBER ESTATE AGENCY

Kuala Lumpur.—698 (662). 10 mths—6,468 (6,414).
Jeram.—335 (337). 10 mths—3,103 (2,978).
Tamiang (Malaya).—79 (79). 10 mths—685 (731).
Sungei Kahang.—179 (158). 10 mths—1,554 (1,448).
Bandar Sumatra.—89 (91). 12 mths—1,031 (1,159).
Batu Kawan.—67 (66). 11 mths—668 (678).
Buntar.—127 (122). 7 mths—764 (720).
Kepitigalla.—68 (56). 4 mths—222 (184).
Langkat Sumatra.—84 (80). 7 mths—536 (506).
Sungei Bahru.—136 (117). 1 mth—136 (117).
Tambira.—109 (104). 1 mth—109 (104).
Tanjong Malim.—348 (373). 1 mth—348 (373).
Amalgamated Rubber.—45 (37). 7 mths—295 (240).
Java Rubber.—69 (84). 7 mths—625 (619).
Soember Ajoe.—24 (21). 10 mths—180 (266).
Sennah.—139 (178). 7 mths—942 (994).

SHARPE ESTALL

Anglo Johore.—37 (32).
Bekoh (CRE).—225 (215). 4 mths—770 (769).
KPRP.—69 (63). 4 mths—238 (235).
Rim (Malacca) RE.—267 (226). 1 mth—267 (226).

Patent Specifications

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Stabilized Polypropylene

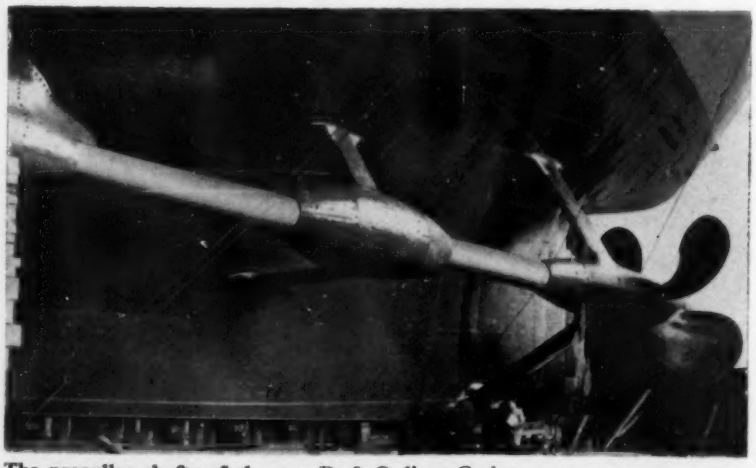
No. 846,695. Union Carbide Corporation. Application and Filed, May 11 1959. Application in USA, May 14 1958. Published, August 31 1960.

Polypropylene containing compositions with improved resistance to oxidative degradation are obtained when up to 5% of para-tetrarylalkyl phenol-formaldehyde A stage resin by weight of the polypropylene is used. The inclusion of antioxidants also improves the heat stability of polypropylene for extended periods at temperatures below its melting point. The low molecular weight resins used are the A stage resins produced by the reaction of para-tertiary alkyl phenols with formaldehyde in the presence of a catalyst. The A stage is the early stage during the reaction at which the product is still soluble in solvents and fusible. The B stage is the intermediate stage in which the product softens when heated and swells in solvents but does not dissolve. The C stage is the final stage in the reaction of a thermosetting resin when it is fully cured, relatively insoluble and infusible.

Shorter Abstracts

Antiozonant Compositions. 841,281. O. W. Burke, Jun. Filed, June 1 1956.—Mixtures of diamines are used as antiozonants for natural and synthetic rubbers. Numerous examples are given of the antiozonants and their use in rubber.

Accelerating Reaction. 845,827. Union Carbide Corporation. Filed, September 25 1958.—Accelerating reactions between compounds containing -NCO or -NCS groups and compounds containing active hydrogen using a catalyst containing a group VB element.



The propeller shafts of the new P. & O. liner *Canberra* are protected against corrosion by wrapping them with 4in. glass tape impregnated with Ciba (ARL) Ltd.'s Araldite epoxy resins

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

CONFIDENCE is not quite what it used to be in the stock market these days. With the old sparkle missing shares have generally kept on the down line most of the time, and when the trading account ended last Friday the industrial index showed a fall of 5.4 on the two-week period which has been covered since we last reported. Another poor display by Wall Street, the threat of a rail strike, gloomy forecasts about the economic outlook from a leading set of backroom boys and an uninspiring industrial production estimate all combined to keep the 'bears' happy and the 'bulls' quiet. But selling so far has remained small. In most instances prices have held up reasonably well. Investors with a stake in top class companies remain reluctant to sell. In spite of the one or two mounting black clouds that can now be seen hovering on the horizon, we feel confident that there will be no major slump ahead. Our advice remains the same — best shares are worth holding on to. Those who decide to sell now could be making a mistake.

Another reason why the business brakes have stayed on rather hard is because of news of a great flood of new issues and Rights plans which have been announced. For instance, BRITISH OXYGEN, BOWATER AND PLESSEY are raising between them £36 million. What must be remembered, however, is that the Autumn queue has only just started to form.

Against this background news from the boardrooms continues to play an important role in day to day affairs. Best of these was the report which came from the mighty IMPERIAL CHEMICAL INDUSTRIES combine. Compared with the first half of 1959, group sales rose by 15% to £288 million of which export sales accounted for £47.3, also an increase of 15%. I.C.I.'s pre-tax profit has bounded 50% to £50.9 million and after a much higher tax grab the group's net surplus is 39% greater at £26 million. Though an increase in the half-time dividend has confidently been expected the sharp rise from 3¾% to 6¼% took the market by surprise. Thoughts have now naturally turned to the final payment. Last year's total was made up by a final of 7½% and though the chairman has said that it would be the intention to make the interim a larger part of the total the absolute minimum to be expected is a final of 6¼% making a 12½% total. It seems not unreasonable, however, to look for a final of 7½% making 13¾%.

Among the many interims that were declared there was one from PLASTIC

Continued on page 550

Share Price Movements

Par Value	Company	1960 High	Low	Sept. 24	Latest
£1	A.E. Ind. Ord.	67/-	45/3	48/6	45/3
5/-	Albright & W. Ord.	31/9	25/9	28/9	28/-
£1	" " " 5% Pref.	17/3	15/6	15/3	15/3
5/-	Anchor Chemical Ord.	18/7½	14/9	16/-	16/-
5/-	Andersons Rub. Ord.	—	—	3/-	3/9
£1	Angus Geo. Ord.	54/-	34/9	53/3	53/-
5/-	Ault & Wiborg Ord.	25/3	20/-	24/7½	23/3
£1	Avon India Rubber Ord.	46/6	35/-	36/3	35/-
£1	" " " 6% Pref.	20/-	17/6	18/9	18/9
10/-	Bakelite Ord.	62/6	39/9	62/6	59/9
£1	" 6% Pref.	19/3	16/9	19/-	19/-
£1	Baker Perkins Ord.	45/6	40/-	46/9	45/6
4/-	Bank Bdg. Rubber Ord.	4/3	2/3	4/-	3/-
4/-	Brammer H. Ord.	18/6	16/9	18/3	18/3
10/-	Bridge, David Ord.	66/6	53/6	65/9	65/6
5/-	Bright, John Ord.	18/6	15/3	17/-	16/9
5/-	Brit. Blting. & Asb. Ord.	—	—	17/6	19/6
£1	" " " Pref.	—	—	17/-	17/3
2/-	Brit. Ind. Plas. Ord.	12/1½	5/3	10/7½	10/1½
2/-	" 10% (tax free) Pref.	4/9	4/3	4/9	4/9
£1	British Xylonite Ord.	113/-	78/9	110/-	111/-
£1	" " 5% Pref.	18/9	14/-	14/4½	14/6
£1	BICC Ord.	61/3	49/9	52/6	51/9
5/-	BTR Ind. Ord.	17/3	9/9	16/1½	16/1½
£1	" " 7½% Pref.	24/3	23/-	22/3	21/3
£1	Courtaulds Ord.	59/4½	44/3xc	57/9	54/9
£1	" 5% 1st Pref.	17/9	16/3	16/3	15/9
£1	" 6% 2nd Pref.	21/-	19/-	19/-	18/6
4/-	Cow, P. B. Ord.	9/6	6/9	8/10½	8/9
£1	" " 5% Pref.	15/6	14/-	14/-	14/-
1/-	Dannimac Mfg. Ord.	12/9	9/-	10/7½	11/3
10/-	De La Rue Ord.	91/-	65/6	75/-	72/3
£1	" " " 3½% Pref.	12/-	10/-	10/3	10/3
10/-	Distillers Co. Ord.	45/7½	32/9	42/10½	42/3
£1	" " 6% Pref.	22/-	19/6	19/6	19/6
£100	" 5% Conv. Loan	£96	£95	£95	£95
£100	" 5½% Unsec. Loan	£97	£87½	£86	£86½
10/-	Dunlop Rubber Ord.	30/6	21/9	29/3	28/6
£1	" " 5½% Pref.	19/-	16/6	16/3	16/3
£100	" 3½% 1st Debs.	£78	£68	£69	£69
£100	" 4½% 2nd Debs.	£87	£80	£79	£79
£1	Eng. Elect. Ord.	53/6	36/3	35/6	35/3
4/-	Ebonite Cont. Ord.	14/3	11/-	11/-	11/3
£1	English China Clays Ord.	95/-	74/6	90/-	86/-
£1	Goodyear Tyre 4% Pref.	12/9	10/9	11/-	11/6
5/-	Greeff Chem. Ord.	35/-	23/6	23/9	25/-
10/-	Greeff Chem. 5½% Pref.	9/-	8/6	9/-	9/-

Par Value	Company	1960 High	Low	Sept. 24	Latest
5/-	Hackbridge Hldg.	17/6	14/3	14/9	15/4½
4/-	Greengate & Irwell Ord.	6/6	5/3	5/9	6/3
£1	Harrisons & Crosfield Dd.	64/-	49/6	53/10½	53/9
1/-	Hunt & Moscrop Ord.	2/9	1/9	2 -	1/10½
£1	Imp. Chem. Ord.	75/3	56/6	67/-	71/3
£1	" " 5% Pref.	18/-	16/3	16/3	16/3
£100	" 4½% Unsec. Loan	£89½	£81	£80¾	£82½
£100	" 5½% Conv. Loan	£212½	£90xc	£91¾	£92½
1/-	Kleemann (O. & M.) Ord.	11/6	8/3	9/10½	9/4½
£1	" " 6½% Pref.	19/-	17/-	17/9	17/6
2/-	Lacrinoid Prod. Ord.	5/-	3/-	4/6	4/6
5/-	Laporte Ind. Ord.	33/6	25/3	30/6	31/3
£1	" " 7½% Pref.	24/3	23/3	23/-	23/3
£1	Leyland & Birm. Rubber Ord.	63/-	46/3	61/-	53/6xd
£1	" " " 6% Pref.	19/-	17/6	18/9	18/9
2/-	London Rubber	14/9	11/-	13/1½	13/-
£1	" 6% Red. Cum. Pref.	20/-	18/9	19/6	18/9
£1	McKechnie Bros. Ord.	71/6	57/-	59/-	60/-
£1	" " 'A' Ord.	69/3	56/-	55/6	61/3
£1	" " 6% Cum. Pref.	18/-	16/-	17/-	17/-
5/-	Monsanto Chem. Ord.	28/-	23/3	27/6	28/6
£1	" " 3½% Pref.	12/9	12/-	12/6	12/6
£100	" " 6% Debs.	£103½	£98	£98	£98
5/-	Miles (H.G.) Holdgs. Ord.	11/3	9/9	9/9	10/-
£1	North British Rubber	21/3	16/6	15/9	16/-
5/-	Northwestern Rubber	—	—	12/9	13/1½
5/-	Plastic Enginrs. Ord.	30/-	20/-	28/9	29/6
5/-	Redfern Holdings Ord.	5/9	4/-	5/-	4/-
2/-	RFD Ltd. Ord.	6/6	4/-	4/-	4/-
£1	" " 5½% Pref.	14/6	12/9	13/9	13/9
2/-	Rubber Imp. Ord.	7/9	4/6	5/-	4/6
2/-	" " 'A' Ord.	7/-	3/3	3/6	3/6
£1	" " 5% 1st Pref.	15/-	11/3	12/3	11/10½
5/-	Rubber Reg. Ord.	19/3	17/-	17/4½	18/-
4/-	Shaw Francis Ord.	27/6	21/3	23/-	22/6
2/-	Silentbloc Ord.	13/3	10/-	12/6	8/9xr
5/-	Storey Bros.	41/3	28/3	41/-	40/-
2/-	Sussex Rubber Ord.	2/3	1/3	2/-	2/-
5/-	Sutcliffe Speak Ord.	15/9	11/-	13/-	13/6
£1	Turner & Newall Ord.	60/10½	48/3	53/6	57/4½
£1	" " " 7% Pref.	25/-	22/3	22/9	22/9
5/-	Universal Asbestos Ord.	50/-	25/-	27/-	25/-
5/-	Viscose Dev. Ord.	16/6	14/9	16/-	16/-
5/-	Warne W. (Holdgs.) Ord.	18/9	15/3xc	17/6	17/6

Rubber Markets

LONDON

A tendency for prices to drift in a mainly dull market was accelerated following a sharp decline at Singapore. Factory demand was small and selective. Business was largely on short-covering account with further switching from near to distant positions, the feature of trading. Latterly an unexpected advance reflecting an upturn at Singapore was short-lived.

Latest prices are as follows:

No. 1 RSS Spot: 29d. nominal.

Settlement House:

November 28⅛d.-28⅜d.
December 28⅛d.-28⅜d.
January/March 28⅛d.-28⅜d.
April/June 27⅞d.-28d.
July/September 27⅛d.-27⅜d.
October/December unquoted.

No. 1 RSS cif basis ports:

October 28⅜d.-28⅞d.
November 28⅜d.-28⅞d.
December 28⅛d.-28⅜d.

Godown:

October 98¼ Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, October, November, 16s. 5d., cif European ports. Spot, seller, 17s. 1d. Bulk, nominal, d.w. 16s. 7d. October. Creamed, seller, nominal, 16s. 2d. October. Normal, seller, October, 14s.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on October 3 was 32.12½ (31.62½) US cents per lb.

DJAKARTA

Quiet trading conditions prevailed on October 3 and no transactions were reported. Sheet No. 1 for ready delivery was offered at 36 rupiahs per kilo but there was hardly any interest from buyers. The market closed steady and quiet despite better Singapore advices.

	Rupiahs per kilo	
	Oct. 3	Previous
Spot No. 1 Priok ..	35.50b	35.50b
Spot No. 2 Priok ..	34.50b	34.50b
Spot No. 3 Priok ..	32.50b	32.50b
No. 1 fine pale crepe, spot	35.50b	35.50b

Tone: Steady and quiet.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on October 3 was 112 (110) Ceylon cents per lb.

SINGAPORE

The market ruled steady throughout the morning of October 3. Sellers were very reserved. Prices advanced two cents in thin trading. Lower sheets were in some demand on a switch basis, but business was selective. The morning session closed steady and quiet. Conditions during the afternoon were steady until just after the official close when after some small selling and hesitant buying prices eased a shade.

	Malayan cents per lb., fob Malayan ports to open ports	
	Oct. 3	Prev. Close
No. 1 RSS, Oct.	101¼–101½	99⅝– 99⅞
Nov.	101⅛–102⅛	99⅞–100⅛
No. 2 RSS, Oct.	99 – 99½	97⅝– 98¼
No. 3 RSS, Oct.	97½– 98½	96 – 96½
No. 4 RSS, Oct.	95½– 96½	94½– 95
No. 5 RSS, Oct.	91½– 92½	89½– 90½
No. 1 RSS, Spot	100½–101½	98½– 99½
No. 3 blanket thick remilled crepe, Oct. ..	84 – 86	81½– 82½
No. 1 fine pale crepe, Oct. ..	105 –106	103 –104
2x thin brown, Oct.	82 – 83	81 – 81½

Tone: Uncertain.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 193.70d. per gallon.

NEW YORK

The New York rubber market ruled as under on October 3:

DEALERS' PRICES

	US cents per lb. ex-dock	
	Oct. 3	Previous
No. 1 RSS, Oct. ..	35½n	35½n
Nov. ..	34½a	34½b–34⅞a
No. 2 RSS, Oct. ..	35n	35½n
Nov. ..	34½a	34½b–34⅞a
No. 3 RSS, Oct. ..	34⅞n	35n
Nov. ..	34½a	34⅞b–34⅞a
No. 1 RSS, Spot ..	35½n	35⅞n
No. 3 amber blanket crepe, Oct. ..	28n	28⅛n

FUTURES—REX CONTRACT

	Oct. 3	Prev. Close
Nov. ..	34.75t	35.10t
Jan. ..	33.60t	34.00t
March ..	33.00t	33.40b–33.60a
May ..	32.50b–32.80a	33.00b–33.30a
July ..	32.10b–32.60a	32.70b–32.90a
Sept. ..	31.90b–32.40a	32.50b–32.70a
Nov. ..	31.75b–31.90a	32.20n

Sales: 26. Tone: Easy.

Futures after early steadiness on October 3 declined on light selling. Traders said physical rubber was quiet. Futures were easy in late dealings on scattered selling.

AMSTERDAM

The Amsterdam rubber market ruled as under on October 3:

	Guilders per kilo	
	Oct. 3	Previous
October	2.83	2.83
November	2.82	2.82
December	2.81	2.81
Oct./Dec.	2.82	2.82
January	2.79	2.77
February	2.79	2.76

Sales: 15. Tendency: Steady.

STOCK MARKET

Continued from page 549

ENGINEERING, of 10%, compared with an equivalent of 5.36%. O. AND M. KLEEMANN have raised theirs by an equal 1½% to 7½% on the capital increased by the 150% share bonus. The company has, in addition, announced that the further expansion of ERINOID is now well under way. Erinoid, which produces plastics, raw material and intermediate products 'will double its output in the next three years as a result of the latest expansion.' The cost of the new buildings and machinery will bring the total capital expenditure since Erinoid's was acquired to over £500,000. NORTH WESTERN RUBBER is resuming interim dividends with a 5% in respect of 1960. A single payment of 12½%, equal to 10% per annum, was paid for the previous 15 month period. It is pointed out that the interim does not imply any increase in the total distribution for the year.

A sharp recovery was shown by LINTAFOAM INDUSTRIES for the year ended June 30, when group profits before tax amounted to £69,300 compared with a previous loss of £23,100. The dividend is doubled at 10%.

Companies in the News

Northwestern Rubber

Northwestern Rubber Company, reclaimed rubber manufacturers, is resuming interim dividends with 5% in respect of 1960. A single payment of 12½%, equal to 10% per annum, was paid for the previous 15-month period.

The interim does not imply any increase in the total distribution for the year, it is stated.

Cape Asbestos

In the event of the offer by Cape Asbestos to acquire the £500,000 ordinary capital of Small and Parkes becoming unconditional, R. H. Dent and T. C. Hale, who are the joint managing directors of Cape Asbestos, will be appointed to the Board of Small and Parkes, with Mr Dent as chairman.

Formosa Change

The Formosa Plastics Corporation has announced the removal of its offices to 62-64 Nanking East Road, Sec. III, Taipei, Taiwan. Cable address: Plasticorp 4448.

Mr H. F. Akehurst, Mr R. M. Fairfield and Mr W. C. Handley have been appointed assistant managing directors of British Insulated Callender's Cables. Mr E. Bowyer and Mr C. H. B. Pipkin have been appointed executive directors. Sir Ronald Scobie, who has been a director of the company since 1947, has resigned from the Board.

Industry INTELLIGENCE

Technical Data

Polyurethane Foams

Two recent additions to the literature issued by I.C.I., Dyestuffs Division, are technical information sheets Urethane PC/U 21 and 23. These are respectively entitled sound absorption properties of rigid and flexible polyurethane foams, and pipe insulation by polyurethane flexible foam.

The sound absorption coefficients of specimens of both rigid and flexible foam have been tested by the reverberation method by the National Physical Laboratory over a range of frequency from 125 to 4,000 c/s. The reduction of sound intensity of the foams was better at high frequency and the absorption coefficients varied from 0.20 (rigid foam at 125c/s) to 0.95 (polyester type flexible foam at 1,000c/s).

The other pamphlet deals with the production of sections for the insulation of piping using Daltolac 41/Suprasec D foams. Handling precautions are mentioned, the production of the foams, foam machinery, moulds, release agents and other features of the moulding process are all discussed. The physical properties, operating range and joining of pipe sections are also described.

Machines, Materials and Equipment

Cheap Automation

The precise control of industrial processes reduces wastage and ensures consistent quality in the product, as well as reducing labour costs. A flexible system of automation, designed for the control of a batch processing plant, consists of a central sequencing controller, built up to meet individual requirements by using appropriate standard units. The controller implements instructions automatically in accordance with a pre-determined programme, so that operations are performed in the correct order and at the correct time; in the event of a defect, it can stop the process and sound an alarm.

It is actuated by electrical signals, received on completion of each stage in a production process, for factors such as time, temperature, pressure, weight, speed, power, density and flow.

The central control equipment consists of a number of basic units, combined in a standard rack. The units available are: (1) The sequencer unit, for stopping and starting the various operations in the correct order; (2) the timer unit, which provides time signals for periods ranging from a few seconds to many hours; (3) the relay unit, which links the sequencer with the external actuators; (4) the alarm unit, for attracting the attention of a supervisor; (5) the variable programme unit, upon which the complete programme of operations is pre-set, and which is used when a number of different processes have to be handled, or where changes in procedure are anticipated; and (6) the operation indicator unit, which gives visual display of the process and indicates the stage in operation at any time.

These six units cover most requirements, and can be used for control of operations such as mixing, heating, cooling, pumping and conveying.

Owing to the use of these standard units, the system, manufactured by Gresham Automation Ltd., Gresham House, Twickenham Road, Hanworth, Middx, does not involve the high capital costs usually associated with full automation, and it makes automatic control a practical proposition at an economic cost for large or small installations. The system can be operated by unskilled labour.

Bench model illuminator magnifier made by Ellis Optical Co., Thornton Heath, with vertical adjustment for height and focus and tilting lens hood. Useful for isolated items and ideal for repetitive examination

Insulgrip Fasteners

The Insulgrip is a new type of fastener moulded in Nylon 66 which offers a tough shakeproof form of anchorage, of particular value when fastening access is limited to one side of the assembly. Two types are currently available, one using a preformed square hole to prevent rotation and the other relying on two round holes. This second type is designed particularly for the electrical industry where large insulation surfaces are required or where it is impractical to form a square hole. When a self-tapping screw is inserted into the fastener it collapses to form a firm fixing. The screw can be removed and replaced any number of times without any loss in efficiency. Samples and further information on this product are available from the manufacturers, George Goodman Ltd., Robin Hood Lane, Birmingham 28.

Publications

Polythene from Pipes

Two Tenite polythene formulations developed for the extrusion of pipe are described in Materials Bulletin No. 1 published by Eastman Chemical Products, Inc.

The bulletin includes physical properties of the resins, pipe extrusion data, and pipe properties of Tenite polythene 2521E-60099 Black, from which Type II pipe may be extruded, and of Tenite polythene 2811E-80010 Black, from which Type III pipe may be extruded. Type II and Type III pipe extruded from the Tenite polythene resins conform to the requirements as defined in the proposed revision of Commercial Standard CS-197.

The Bulletin, 'Tenite Polyethylene Compounds for Pipe Extrusion,' is available upon request from the plastics division, Eastman Chemical Products Inc., subsidiary of Eastman Kodak Company, Kingsport, Tenn.

Resin Laminating

Resin laminates, in structural applications, have the advantages of light weight, absence of corrosion and ease of fabrication into complex shapes. Because of these properties they are increasingly used and are to some extent replacing conventional materials such as wood and metal.

Shell Chemical Company Ltd., manufacturers of Epokite resins, have recently published a technical bulletin TB/RES/153 on the laminating applications of their products. This lists some of the applications, gives the characteristics of the resins available together with the hardeners, accelerators and fillers which may be used with them, the reinforcement materials used to form laminates and details of the curing techniques.

The second part of the booklet is devoted to descriptions of the laminating methods used, including wet lay-up, vacuum bag moulding, pressure bag moulding, match moulds and winding. Resin injection methods and spraying are also considered. The remaining pages give notes on handling, the preparation of pre-impregnated cloth, suggested formulations for wet and dry lay-up methods and details of the physical and chemical properties of laminates produced by the methods described.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

STYLAR (B792,198) Furniture and parts thereof, all made of plastics. Plastic Engineers Ltd., Treforest Industrial Estate, Pontypridd, Glamorganshire. (Class 20; September 20 1960).

DEGUSSA

(803,507) Bags included in Class 22 and sacks, all of synthetic resin plastic material. Deutsche Gold-Und Silber-Schiedeanstalt Vormals Roessler, 9 Weissfrauenstrasse, Frankfurt on the Main. Address for service is c/o Elkington and Fife, Bank Chambers, 329 High Holborn, London, W.C.1. (Class 22; September 20 1960).

DEKKOPAD (805,402) Mats included in Class 27, and floor coverings, all made of plastics. Scrubb and Co. Ltd., Wimbledon Factory Estate, Morden Road, Wimbledon, London, S.W.19. (Class 27; September 28 1960).

BENDIKIT (804,311) Toys made wholly or principally of rubber or of synthetic resins. Newfeld Ltd., Newfoam Works, Spelthorne Lane, Ashford, Middlesex. (Class 28; September 28 1960).

IRIDON (798,298) All goods included in Class 2. Commercial Plastics Ltd., Willington Quay, Wallsend-on-Tyne, Northumberland. (Class 2; September 28 1960).

RIL-HOME

(805,351) Furniture, poufs (being articles of furniture), mirrors included in Class 20, and picture frames; and articles included in Class 20 made of wood, cork, cane, wicker, horn, bone, plastics, celluloid or of imitations of all these materials. Rubber Improvements Ltd., Rilex House, Chandos Street, London, W.1. (Class 20; September 28 1960).

NEW COMPANIES

Gosport Dental Laboratory Ltd. (667,604).—August 12. Capital: £100 in £1 shares. The directors are: William J. A. Reed and Mrs. Nancy Reed, both of Wootton Avenue, Western Way, Alverstoke, Hants.; Douglas W. Campbell and Mrs. Tui E. Campbell, both of 54 Hammond Court, Gosport, Hants. Regd. office: 8 Stoke Road, Gosport, Hants.

Bentota Holdings Ltd. (667,192).—August 10. Capital: £100 in 2s. shares. To acquire the whole or any part of the issued share capital of and the undertaking, property and assets of The Rubber Estates of Bentota Ltd. Regd. office: Palmerston House, 51 Bishopsgate, E.C.2.

A. E. Taylor and Co. (Sunderland) Ltd. (668,702).—August 29. Capital: £10,000 in £1 shares. To carry on the business of manufacturers and processors of and dealers in all articles composed wholly or partly of rubber, leather, asbestos, plastics, etc. The directors are: Ernest F. Dix (permanent), 4 The Close, Whitburn, Co. Durham (director of Sunderland Properties Co. Ltd., etc.); William L. Benson, 20 Laburnum Road, Sunderland. Regd. office: 44 Borough Road, Sunderland.

Kaylis Chemical Ltd. (668,675).—August 26. Capital: £5,000 in £1 shares. To carry on the business of manufacturers of and dealers in thermoplastic moulding compounds, plastics, etc. Solicitors: Slaughter and May, 18 Austin Friars, E.C.2.

Bermet Co. (Southern) Ltd. (669,887).—September 13. Capital: £1,000 in £1 shares. To carry on the business of importers, manufacturers and distributors of and wholesale and retail dealers in abrasive materials of all kinds, electric tools and plastics, protective and decorative coatings and metal treatments, etc. The directors are: Percival S. Davies (permanent), Cromwell House, Lamberhurst. Beryl C. Cook, 1 Down Avenue, Lamberhurst. Regd. office: 17 Upper Grosvenor Road, Tunbridge Wells.

Art Print Productions (Maidenhead) Ltd. (669,885)—September 13. Capital: £3,000 in £1 shares. To acquire the business of art and silk screen printers, creative artists, display producers in timber, wire and plastics, vacuum formers in plastics and printers of novelties now carried on by Peter Cook and Derek Cook at Bridge Boathouse, River Road, Taplow, as 'Artprint Publicity.' The directors are: Peter Cook and Derek Cook, both of Bridge Boathouse, River Road, Taplow, Maidenhead. Regd. office: Bridge Boathouse, River Road, Taplow, Maidenhead.

Halmatic Ltd. (669,397).—September 6. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in natural and synthetic plastics, etc. Regd. office: 72 Wigmore Street, W.1.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on August 24 1960

L. Berger and Sons Ltd. Manufacture of alkyd resins. 845,861.

T. Ambrus. Compound fabric and the reinforcement of mouldings therewith. 845,744.

Rubber Improvements Ltd., and J. Lewis. Anti-static belting of plastic, rubber or synthetic elastomer. 845,870.

Dunlop Rubber Co. Ltd. Elastic webbing. 845,754.

Freudenberg Komm-Ges., Auf Aktien, C. Production of fibrous structures impregnated with adhesives. 845,418.

Montecatini Soc. Generale Per L'Industria Mineraria E Chimica. Process for polymerizing olefins with catalysts containing organo-tin compounds. 845,878.

Chemstrand Corporation. Preparation of anhydrous solutions of acrylonitrile vinylpyridine copolymers. 845,993.

Upson Co. Dimensional stablization of cellulose. 846,098.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister Lucius and Brüning. Manufacture of mixed chlorination products of low pressure polyolefines and hydrocarbons. 845,361.

Union Carbide Corporation. Ethylvinylsiloxane cyclic polymers. 845,554.

R. Mille. Apparatus for the injection of plastic materials. 845,435.

Farbwerke Hoechst Atkiengesellschaft Vorm Meister Lucius and Brüning. Method of improving the stability of polytrifluorochlorethylene. 846,120.

Owens-Illinois Glass Co. Method of treating glass surfaces. 845,439.

General Electric Co. Preparation of impregnated sheet materials and laminates. 845,896.

Sun Oil Co. Polymerization of olefins. 845,903.

Imperial Chemical Industries Ltd. Diisocyanates. 845,446.

R. Torjusen. Method of reinforcing articles moulded from expandable plastics material. 846,020.

Firestone Tyre and Rubber Co. Laminated article. 845,908.

Soc de la Viscose Suisse. Polyamides. 845,730.

Monsanto Chemicals Ltd. Production of low molecular weight homopolymers. 845,672.

E. I. Du Pont De Nemours and Co. Polyethylene coating compositions and coated pellicular structures. 845,372.

R·J·I·P· CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

ASSISTANT chemist or technologist required for laboratory of company producing wide range of moulded and extruded mechanicals, including sponge. This is an interesting and progressive position. Pension scheme in operation in addition to the compulsory pension.—Details of experience and salary required, in confidence, to Managing Director, Capon Heaton and Co. Ltd., Hazelwell Mills, Stirchley, Birmingham, 30. (570)

A VACANCY occurs for a young rubber technologist of L.I.R.I. standard. Experience in footwear compounds would be an advantage. This is an opening with good prospects.—Applications, which will be treated with confidence, should be addressed to:—Sam Kay Rubber Co. Ltd., Hope Mill, Portwood Place, Stockport. (542)

THE International Synthetic Rubber Company Limited invite applications for the positions of

SHIFT PLANT SUPERINTENDENTS

Due to expansion and promotion further vacancies have arisen which offer excellent opportunities to graduate chemists or chemical engineers between the age of 21 and 28 to gain valuable experience in the operating of our large general purpose synthetic rubber plant. Previous production experience in a continuous process in the chemical industry would be an advantage. The company will also consider unqualified men who have suitable practical experience in operating a continuous chemical plant. Shift Plant Superintendents are responsible to the Production Manager for the entire production operation and the supervision of associated shift personnel. The company has generous pension and sickness benefit schemes and good working conditions exist in a modern plant situated on the edge of the New Forest. Salaries will be in line with the applicant's experience and qualifications. Write, stating age, qualifications, experience and commencing salary expected to the Personnel Manager of the Company at Hythe, Near Southampton. (569)

APPOINTMENTS VACANT

PRODUCTION EXECUTIVE

RUBBER FACTORY

The Rubber Division of a Nationally-known Group of Companies situated in the North of England has a vacancy for a competent and resourceful Production Executive.

Candidates must have a detailed knowledge of modern practice of mixing, calendering, extrusion and moulding processes. They should possess A.I.R.I. or similar technical qualifications, and have experience in works management and have a knowledge of work study and production control techniques. Preferred age range 33-45.

The Executive appointed will be required to make a major contribution to the development and continued expansion of the Division and should therefore be capable of developing and introducing new techniques and methods.

Salary will be not less than £1,500 per annum, car provided, pension scheme. A house can be provided initially if required.

Applications, which will be treated with the strictest confidence, should state age, qualifications, experience, appointments held with salaries earned, and should be addressed to Urwick, Orr & Partners Ltd., who have been invited to advise in this appointment, at Urwick House, 14 Hobart Place, London, S.W.1, quoting reference WLO 1438 on the envelope. (564)

APPOINTMENTS VACANT
(continued)

MILL Room Manager required by expanding Midlands company specialising in the production of engineering components in a wide range of natural and synthetic rubbers. Must be experienced in all aspects of mill room activity, particularly extruding, and capable of taking complete control. Splendid opportunity in a progressive organisation; good salary with pension and life assurance scheme.—Applications, which will be treated in confidence, should give full details of experience and be addressed to Box 563. (563)

Donald Leaver Limited

1 LONDON ROAD, STAINES, MIDDX. Phone STAINES 55271-2

FOR SALE: A David Bridge hydraulic single knife bale-cutting press, 18in. ram with pump. (571)

MACHINERY FOR SALE
6d. a word, Minimum 12/6 Box 2/-

'COTSWOLD' dipping machines and circulating tanks for latex and PVC. New catalogues now available on request.—Lionel Hook and Sons, Ebley, Stroud, Glos. Tel.: Stonehouse 614/5. (380R)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

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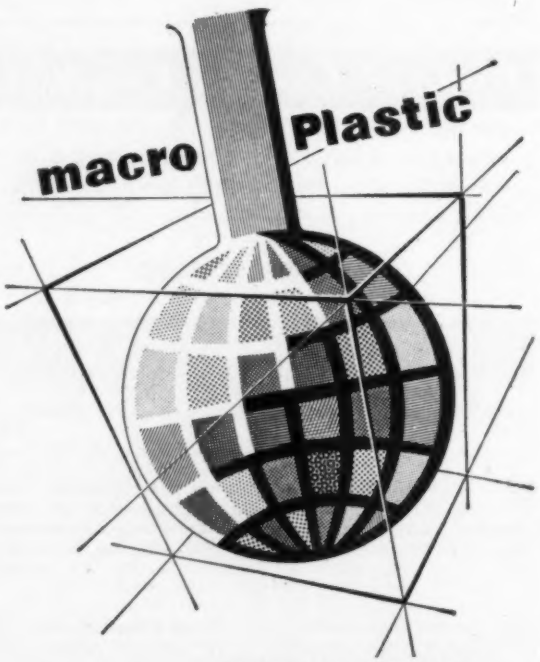

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INDEX to ADVERTISERS

Page numbers below indicate the last occasion on which an advertisement appeared in this volume. Where the advertisement appeared on the covers or in the supplement, the figure in parentheses is the number of this issue

	Page
Abrasive Developments Ltd.	viii (13)
A.E.W. Ltd.	ix (12)
Allcock, J., & Sons Ltd.	vii (13)
Amalgamated Oxides (1939) Ltd.	viii (13)
Anchor Chemical Co. Ltd.	Cover i
Anderson, Joseph, & Sons Ltd.	i (12)
Armour Hess Chemicals Ltd.	v
Associated-Rediffusion Ltd.	—
Astor Boisselier & Lawrence Ltd.	206
Baker Perkins Ltd.	vi (14)
Barfoot, T. W., & Webb, W. F.	480
Barwell Engineering Ltd.	v (8)
Belgrave Industries (Exports) Ltd.	481
B.I.P. Chemicals Ltd.	ix (11)
Birch, Singleton, W., & Sons Ltd.	443
Boston Marine & General Eng. Co. Ltd.	351
Bramor Ltd.	75
Bridge, David, & Co. Ltd.	Cover ii
Bright, John, & Bros. Ltd.	ii
British Electrical Development Association	427
British Geon Ltd.	462
British Nylon Spinners Ltd.	ii (11)
British Recovered Rubber Co. Ltd.	540
British Resin Products Ltd.	vii (12)
British Titan Products Co. Ltd.	x (12)
Bush Beach & Segner Bayley Ltd.	88
Cabot Carbon Ltd.	497
Carter Bros. (Rochdale) Ltd.	vi (12)
Carlton Press Knives, Ltd.	555
Catalin Ltd.	—
Chemical & Insulating Co. Ltd., The	—
C.I.C. Engineering Ltd.	xiii (13)
Cleggswood Oil Distillery Ltd.	555
Cohen, George, Sons & Co. Ltd.	—
Collison Engineering Co. Ltd.	—
Columbian International (Gt. Britain) Ltd.	i
Consolidated Zinc Corporation (Sales) Ltd.	ii (14)
Crosfield, Joseph, & Sons Ltd.	423
Croxton & Garry Ltd.	520
Cruickshank, R., Ltd.	—
Davis Plastics Ltd.	—
Draper, Henry, & Co. Ltd.	—
Dietzel, Hugo	480
Dixon, T. H., & Co. Ltd.	i (13)
Dunlop Rubber Co. Ltd.	414
Du Pont Co. (United Kingdom) Ltd.	522
Durham Raw Materials Ltd.	viii (12)
Economist Intelligence Unit Ltd., The	—
Ellison, George, Ltd.	viii (11)
English Clays Lovering Pochin & Co. Ltd.	555
Esso	532-533
eur-O-matic	405
Factice Research & Development Assoc.	—
Fawcett Preston & Co. Ltd.	iv (11)
Fellner & Ziegler GmbH.	—
Ferguson, A. O., & Co. Ltd.	viii
Ferguson, James, & Sons Ltd.	ix
Ferguson Shiers Ltd.	202
Firestone Tyre & Rubber Co. Ltd.	255
Foamair Ltd.	483
Forrest, H., & Sons (E.P.M.) Ltd.	—
Gardner, Henry, & Co. Ltd.	ii (14)
General Utilities (Stockport) Ltd.	iii (14)
Goodyear Tyre & Rubber Co. Ltd.	388
Grantham Rubber Machinery Co. Ltd.	—
Groeff, R. W., & Co. Ltd.	x (13)
Gresham & Craven Ltd.	ii (6)
Gummi und Asbest	ix (9)
H. K. Import & Export Ltd.	iii (14)
Halsteads Engineers (Leyland) Ltd.	ix
Hankin, Geo., & Co. Ltd.	367
Hardman & Holden Ltd.	iv
Hatcham Rubber Co. Ltd.	viii
Hay & Robertson Ltd.	504
Hercules Powder Co. Ltd.	—
Hilton, Wallace, & Co. Ltd.	iv (14)
Hodgson, Richard, & Sons Ltd.	—
Hubron Rubber Chemicals Ltd.	Cover iv
Hughes & Hughes Ltd.	480
Hunt Heat Exchangers Ltd.	445
Iddon Bros. Ltd.	xii
Imperial Chemical Industries Ltd. (Billingham)	453
Imperial Chemical Industries Ltd. (Dyestuffs)	493
Imperial Chemical Industries Ltd. (Plastics—Butakon)	iii
Imperial Chemical Industries Ltd. (Terylene)	375
Institution of the Rubber Industry	504
International Corporation Ltd.	vi (11)
International Synthetic Rubber Co. Ltd.	525
Ioco Ltd.	331
K. W. Chemicals	379
Kautschuk und Gummi	185
Kendell, T., & Sons Ltd.	394
Ketjen Carbon	56, 57
Latex Engineering Co.	510
Lavino (London) Ltd.	—
Leeds & Bradford Boiler Co. Ltd., The	iv (10)
Lonabarc Ltd.	x (11)
Lord, R., & Sons Ltd.	viii (12)
Marsman, G. J.	—
McKechnie Bros. Ltd.	202
Maclaine, Watson & Co. Ltd.	vii (1)
Micafine Ltd.	vi
Monsanto Chemicals Ltd.	455
Muehlstein, H., & Co. (London) Ltd.	556
Muller, Max	vii (2)
National College of Rubber Technology	—
Nederlandsch Verkoopkantoor Voor Chemische Producten N.V.	56, 57
New Conveyor Co. Ltd.	428
Northwestern Rubber Co. Ltd.	x
Novadel Ltd.	iii (10)
Oldham, Thomas, Ltd.	—
Oswald & Duncan Ltd.	x
Philblack Ltd.	408
Phoenix Rubber Co. Ltd.	iv (13)
Planters Engineering Co. Ltd., The	vi (4)
Polymer (United Kingdom) Ltd.	299
Preston Tyre Fabric Manufacturing Co. Ltd.	xi
Price's (Bromborough) Ltd.	377
Pullen, James H., (1942) Ltd.	434
Reed Bros. (Eng.) Ltd.	476
Revue Generale du Caoutchouc	iv (14)
Rhein-Chemie GmbH.	546
Robinson Bros. Ltd.	viii (10)
Robinson, Joseph, & Co. Ltd.	501
Rotunda Ltd.	—
Rubber Age (New York) Ltd.	506
Rubber Latex Ltd.	506
Rubber Regenerating Co. Ltd., The	Cover iv (14)
Shaw, Francis, & Co. Ltd.	Cover iv
Shell International Chemical Co. Ltd.	463
Shell Mex & B.P. Ltd.	—
Smith, Alfred, Ltd.	iii (3)
Smith, Wilfrid, Ltd.	xi
Sondes Place Research Laboratories Ltd.	—
Squire, Frederick, Ltd.	407
Stechler, L., & Co. Ltd.	iv (14)
Steel, J. M., & Co. Ltd.	Cover iii (11)
Steele & Cowlishaw Ltd.	v (8)
Stocker, W. B., & Co. Ltd.	vi (10)
Storeys of Lancaster	vii (10)
Stott, James, Ltd.	v (14)
Sutcliffe Engineering Components Ltd.	555
Sutcliffe Speakman & Co. Ltd.	491
Swinnerton, S. & J. H., Ltd.	—
Tanner Bros. (Greenfield) Ltd.	ii (10)
Tilghman's Ltd.	ii (13)
Union Carbide Ltd.	iv (8)
United Norit Sales Corporation Ltd.	v (6)
United Wire Works Ltd., The	vii
Universal Oil Co. Ltd.	289
Universal Oil Products Co.	Cover ii
Vacu-Blast Ltd.	ix (12)
Verson Engineering Co. Ltd.	479
Vulcan Equipment Co. Ltd.	—
Wallace, H. W., & Co. Ltd.	xi (13)
Wallis Engineering Co.	479
Welwyn Tool Co. Ltd.	443
Wiggins, Teape Group, The	—
Witco Chemical Co. Ltd.	510
Zama Ltd.	479

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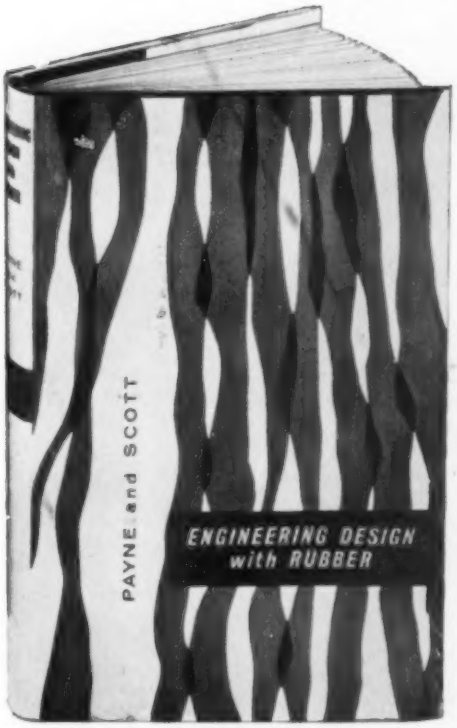

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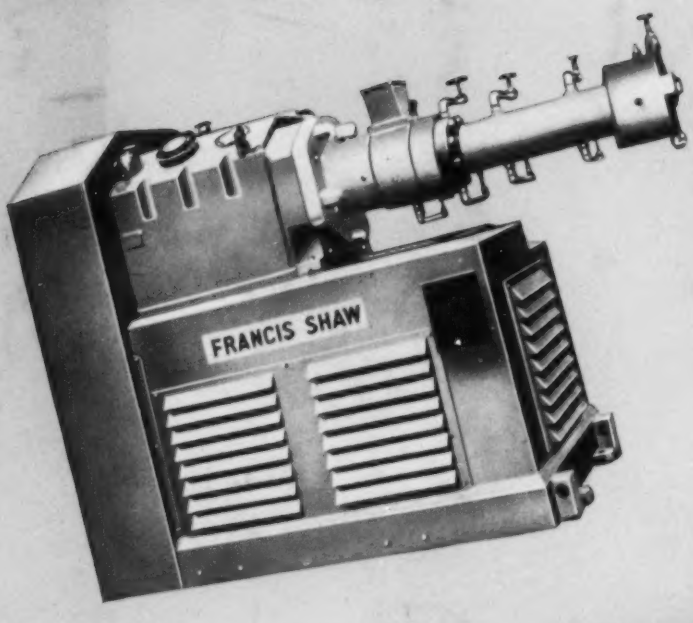

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